Market structures in arts and entertainment

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Market Structures in Arts & Entertainment

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MARKET STRUCTURES IN ARTS AND ENTERTAINMENT

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de Vrije Universiteit Amsterdam,
op gezag van de rector magnificus
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Jaap Boter
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Voor Frans Bosboom, voor alle wijze lessen en
vele mogelijkheden die je me bij KBM hebt geboden

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Preface

In the Middle Ages, the core curriculum of university education consisted of the seven liberal arts, divided across two stages. The first three arts, or Trivium, were the studies of language: grammar, rhetoric, and logic. The next four arts, or the Quadrivium, were the studies of numbers: arithmetic (pure numbers); geometry (numbers in space); music (numbers in time); and astronomy (numbers in space and time). Since then, musicology has moved away from its classical roots and is, certainly in The Netherlands, devoted primarily to music history. In current times, therefore, the pursuit of a PhD in Economics by a musicologist has become a bit of a leap.

To venture such a leap takes more than just a driven enthusiast. It takes at least two. I am very grateful to Michel for accepting the supervision of a musicologist with no statistical training, no PhD position or research funding, only equipped with enthusiasm, some spare time, and a basic notion of what marketing is about. Particularly as the process had to be stretched in time and space, I have been grateful for this patience. I also have much to thank him for in the direction of my research. While my original idea was to relate lifestyle differences to genre preferences, his idea to look into transaction data for patterns first has proven to be inspiring; it has become the major thrust of my research. Also, starting with no statistical background, it should be evident from this research how much Michel has taught me. Finally, he has encouraged me to later on switch career (and PhD) to marketing and has even inspired me to undertake a more thorough quantitative training after this PhD. In addition, I am pleased that Ruud Frambach joined this project in the final phase as copromotor. His help in putting the papers together into one thesis and in the practical matters of the procedure have helped to alleviate the challenges of a thesis process stretched in time and space.

This thesis is a collection of four papers. Apart from Michel Wedel as co-author on all four, Leo Paas and Jeff Inman have been co-authors of the study reported in chapter 4; Jan Rouwendal has been co-author of the study reported in chapter 5. They have contributed substantially to the respective papers, in particular the statistical part of those papers, and I have thoroughly enjoyed working with and learning from them. I am pleased that these cooperations are continuing. Furthermore, a particular note of gratitude goes to the four experts involved in the research reported in chapter 4, who voluntarily undertook a mammoth rating task: Ingmar Leijen, Caro van der Meulen, Marieke Rovers and my father, Barend Boter. This project is the crown on this research and this could not have been achieved without their help. Furthermore, the four studies have benefited from all those who commented on the individual articles: editors, anonymous reviewers, and colleagues. In the final stage of the process, the PhD committee, consisting of Gary

Bamossy, Cees de Bont, Tammo Bijmolt, Tom Groot, Piet Rietveld and Nachoem Wijnberg, has made many important suggestions for improvement on the first draft.

In working on my research I have also received a lot of support from several organizations. The Stichting Lezen, Cubiss (formerly the Provinciale Bibliotheek Centrale Noord-Brabant), and the Fonds Wetenschapswinkel of the Vrije Universiteit Amsterdam have supported this research financially, while a number of arts organizations have provided the datasets essential for this research. The Faculty of Economics and Business Administration of the Vrije Universiteit Amsterdam in the final stages gave me time to complete the thesis. Also, since last year, a number of arts organizations have participated in a steering committee for my research program, including the Dutch Museum Association (Jeroen Branderhorst); the Dutch Public Library Association (Cedric Stalpers); the Association of Theater and Concert Hall Directors/Bureau for Promotion of the Performing Arts (Willem Wijgers); Toneelgroep Amsterdam (Renée Jongejan); the Amsterdam Central Box Office/AUB (Anatal Perlin, Anna Elffers); and Cubiss (Liesbeth van Weert, Ewout Sanders). I much enjoy the regular meetings we have at the VU and appreciate the help in making sure my research really benefits arts organizations – as that is a primary drive and goal of my research.

Where the support of colleagues is concerned, the first person to mention is Frans Bosboom. While the Faculty of Arts of Utrecht University was unable provide any research time or facilities at the time, Frans has always supported me, both during my musicology degree course there, and later, when I returned as a lecturer. In addition, I have much enjoyed working with and talking to my other (former) colleagues in Utrecht; particularly Clara Pafort, whose research interests only seem to differ from mine in the observed time period. This now extends to my colleagues at the VU, both all those at the Marketing department and as well as Information & Logistics, Spatial Economics and Accounting, and colleagues at other universities, such as Gary Bamossy (University of Utah), Mariëlle Creusen (TU Delft), my ex-roommate Willemijn van Dolen (Universiteit van Amsterdam), and Jordi López (Universitat Autònoma de Barcelona). Also, although I only occasionally visited Michel in Groningen, his colleagues have always taken a great interest in an ‘outsider’ like me. I particularly want to thank Peter Leeflang for his interest and help in my research and career. I have appreciated this very much.

On a closer note, I am thankful to my friends and family for their patience and interest. Certainly as most of this research was pursued in my spare time, I regularly have had to decline invitations and obligations. Frank, Hans and Ron in particular: I hope to soon catch up on all the drinks I have had to miss. For my parents I hope the joy they may take in this occasion somewhat goes towards their unconditional support, interest and encouragement over all these years.

Finally, Sjoer, Saar, and since very recently, Flora: They have exhibited the admirable balance of letting me enjoy my research whilst also reminding me what really matters in life.

1. Introduction

1.1 Why arts and entertainment?

> "But one might ask, why is it all so important and interesting with a 'keen sense of excitement'? What new theories, concepts, relationships, or other contributions to knowledge or to practice can we expect to emerge from the study of esthetics? To place this body of research in perspective, let us see what would happen if these same studies and methodologies had been applied to frozen and canned peas instead of the opera and the symphony.
>
> Whereas esthetics involves 25 billion of our Gross National Product in dollars; canned peas – that is, pea consumption – I estimate to be in excess of several trillion units per year. And I estimate that this is a most significant portion of the Gross National Product in units.
>
> Holbrook would have begun the session with a plea that we need a theory of pea consumption. Belk and Andreasen would inform us that perhaps we should have two kinds of peas in our repertoire--one using famous hybrid peas and well known canners and another cheaper variety with discounts for twin-pack purchasers. Semenik and Young would have done a massive study on the correlates of pea purchase with the purchase of frozen corn and cauliflower and conclude with excitement that they got some significant correlations between peas and cauliflower. Sexton and Britney would have found some multi-variate vectors and Huber and Holbrook would have concluded that complicated pea shapes are less preferred than simple round ones".
>
> [*Hal Kassarjian as discussant in one of the first ACR sessions on preferences and choice behavior in the arts* (Kassarjian 1980)].

This thesis is devoted to marketing and consumer behavior in one particular field: arts and entertainment. Whilst personal background and particular needs of organizations in this field have been major drivers in initiating this research, the choice for one particular field will need more defense than that. After all, the remarks of Kassarjian (1980) are not without ground. Why study one field in particular? What is next? The bicycle market in Amsterdam? The consumption of apple pie in the United States? Although the choice for a field to investigate a particular phenomenon is in part always a matter of personal preference, fact is that from the 1980s onwards many researchers in marketing and consumer behavior have chosen arts and entertainment in particular as their research setting. Kassarjian (1980) himself saw a rather Machiavellian motivation:

> "Outside of an interest in art and esthetics, per se, more important is the fact that we in management, marketing and consumer research have often been accused of being instruments of big business and of the peddling of unwanted and unneeded goods. Certainly our research is not as prestigious as research in physics, or mathematics, humanities, arts, or the double helical structure of the DNA molecule.
>
> And we have learned well from the torment of the 1960's, turning from canned peas to studies in social responsibility, public policy, consumer protection, and consumer discontent. For here the work somehow appeared to be more significant, more prestigious and more relevant. Now that the word "relevant" is no longer quite as relevant in our society; perhaps, as the Robert Barons learned a near century ago, being a patron of the arts cleanses one's soul. Just perhaps research in esthetics offers a method of gaining legitimacy in a field of research that is not yet all that prestigious. And if nothing else, research in esthetics, arts, opera, and symphony performances is prestigious in the ratified atmosphere of academia.

> To summarize, these papers make it clear that there may well be quality data consumer researchers can offer the arts industry even if it is not always embraced with tender appreciation. In turn we as researchers are offered legitimacy in our research. And that is more than reason enough for consumer research to make whatever contributions it can in this emerging field" (Kassarjian 1980).

While there will undoubtedly be some truth in Kassarjian's (1980) observation, the primary aim of this chapter is to show that arts and entertainment are more than an opportunistic field providing legitimacy and prestige. We will review previous research in this area to argue that particularly a number of specific characteristics of arts and entertainment have made this field interested to so many marketing and consumer behavior researchers. To delineate this literature review, we here limit the field of arts and entertainment specifically to staged performances and screenings (concerts, theater performances, movies), museums, and public libraries; as well as their products (cd's, novels, dvd's, et cetera), also in other media formats and in other settings (e.g., background music), as these are obvious examples of arts and entertainment.

In reviewing the literature, we distinguish two main periods. The first period, roughly running from the late 1970s to the early 1980s, is marked by the extension of marketing to non-profit sectors. Much of the research into arts and entertainment is descriptive and the principal drive is to show that marketing concepts can indeed be applied to this sector. In the second period, the mid 1980s and onwards, after the seminal work of Hirschman and Holbrook (1982) and Holbrook and Hirschman (1982), authors address the particular characteristics of this field. Research focuses more on theoretical development and uses a wide variety of perspectives. Apart from these two periods, there is an additional cluster of related research. Examples are the use of arts and entertainment as a convenient, but more accidental field for research and the use of art theory to understand marketing phenomena.

These three clusters and the most significant research topics in those clusters are summarized in table 1.1, serving as a framework for a more detailed discussion of the literature in the following paragraphs. This inventory will then serve as the backdrop to chart out the focus of the present research against, the second aim of this chapter.

Table 1.1 Overview of the marketing and consumer behavior literature on arts and entertainment

Late 1970s and early 1980s

Testing the water • Can the arts be captured in marketing terminology	Market structure analysis • Segmentation (a priori) • Preference mapping	Forecasting • Attributes driving demand for theater performances

Mid 1980s and onwards

Product characteristics

Sensory • Sensory perception • Sensory preferences • Sensory satiety ↓ Need for variety/novelty	*Fantasy/symbolic* • Analysis of symbolism • Meaning transfer	*Emotive* • Attachment of emotions to music
↓	↓	↓

Subsequent market characteristics

Continuous, large supply of new, unknown goods. ↓ • Critics/reviews • Collaborative filtering and product presentation • Channel management • Bundling • Forecasting (movies, theater) • Network externalities	Use of arts and entertainment symbols by: • Countries • Groups • Individuals • Industry	Use of background music as: • Mood inducement (retailing) • Affect inducement (ads)

Related research

- Art a source of information about consumers, in the past or present.
- Arts and entertainment as (convenient) setting for research into services and other topics.
- The use of art theory to analyze advertising.

1.2 The late 1970s and early 1980s

Although some have argued that the marketing concept is not applicable to the (production of) arts (e.g., Hirschman 1983), others quickly took up Kotler's (1975) plea to broaden the marketing concept to non-profit organizations such as the arts. Some of the first studies may be seen as 'testing the water', such as Stibal's (1977) case study of disco's as a new marketing system or Bates' (1983) attempt to describe the visual arts market in general marketing terms like price developments and financial analysis. Similarly, Legum and George's (1981) survey among dance companies about their opinions on marketing and marketing techniques and whether they apply them may be seen as such. These studies are primarily descriptive, testing whether the arts can be captured in marketing terminology.

Most research into arts and entertainment in this early period, however, is devoted to 'market structure analysis', a term that – in marketing – refers to a specific collection of methods in which commonly, consumer preference or choice data are used summarize consumers and/or products into a number of segments or to position them on dimensions (Day, Shocker, and Srivastava 1979)[1]; a topic which particularly in the 1980s attracted research attention in mainstream marketing (e.g., Grover and Srinivasan 1987; Rao and Sabavala 1981; Urban, Johnson, and Hauser 1984) and is to aid strategic marketing planning.

Applications in arts and entertainment focusing on segmentation have mostly used an a priori behavioral segmentation and have centered on characterizing the derived segments. Ryans and Weinberg (1978), for instance, look at entry and career patterns of theater subscribers and use a discriminant analysis to determine how these segments differ in terms of socio-economic variables, television behavior, cultural activities, benefits sought and intention to resubscribe. In a similar vein, Andreasen and Belk (1980) try to determine who visits the (performing) arts and finds that, where previous studies found a role for socio-economic variables, leisure and general lifestyle characteristics are more likely to predict future attendance. Also Robbins and Robbins (1981) start with an a priori segmentation of museum visitors into high, low and moderate attendee segments and use discriminant analysis to determine how these segments differ in terms of what they currently attend, plan to attend in future, information sources they use and their socio-demographics. Only Sexton and Britney (1980) use a crude, but exploratory approach in identifying segments of arts patrons.

Applications in arts and entertainment focusing on dimensions in product preference are mostly methodological, using arts and entertainment stimuli merely as illustration. For instance, Huber and Holbrook (1979) use samples of jazz recordings to show how different approaches of analyzing relevant dimensions in preference reveal

[1] Note that outside this area, "market structure" has a much broader meaning and, for instance, also includes structures in the supply side. In this thesis, the term "market structure analysis" refers to its specific meaning within marketing.

different results. Similarly, Holbrook and Holloway (1984) illustrate the use of basic techniques of preference structures for decisions in radio programming.

Finally, there are the first studies into forecasting the demand for performing arts. Currim, Weinberg and Wittink (1981) use conjoint analysis to discover what elements drive the demand for subscription packages. Weinberg and Shachmut (1978) report a regression model to forecast the demand for future theater performances.

1.3 The mid 1980s and onwards

From the mid 1980s onwards, research interest is rapidly growing. Where many of the earlier works are primarily descriptive studies, later studies focus more on theoretical development. These studies show a kaleidoscopic variety in the art or entertainment genre studied, in research discipline, in methodology, and in theoretical concepts.

In marketing and consumer behavior theory there is no overall model that integrates all research and that may serve as a structure to compare research interest into this field to. However, a fruitful frame of reference may be found in the hedonic character of arts and entertainment. Hirschman and Holbrook (1982) define hedonic consumption as "those facets of consumer behavior that relate to the multisensory, fantasy and emotive aspects of one's experience with products". Whilst many products may have hedonic facets, arts and entertainment are particularly considered to be exemplary hedonic products (Hirschman and Holbrook 1982). These three definitional aspects of hedonic consumption (multisensory, fantasy, and emotions) may then be considered in how these are processed and used by consumers and their consequences for market characteristics.

1.3.1. Sensory stimulation and the need for variety/novelty

As sensory stimulation is a key feature of arts and entertainment, this is a popular field for research into sensory perception. For instance, Shapiro and Spence (2002) use music to show that sensory attributes like sound quality are often ambiguous and difficult to encode and retrieve. Providing criteria is found to facilitate memory tasks. Joy and Sherry (2003) study museum visitors to investigate how senses work together in perceiving and processing.

The amount of sensory stimulation needed to elicit an optimal hedonic response has attracted particular research interest. Many studies have found the quantity of information or complexity to play a role in arts consumption (e.g., Garbarino and Johnson 1999; Holbrook 1981; Putler and Lele 2003). But also in less high brow forms of entertainment, such as jazz music (Huber and Holbrook 1980), Greek dance music (Kellaris 1992); or computer games (Holbrook et al. 1984), the quantity of information of complexity has been found to be an important factor in enjoyment. Consequent empirical research into consumer preference for complexity in art and entertainment has mostly been supportive of a nonmonotonic relationship in the form of an inverted U-shape or 'Wundt curve' (Berlyne 1960), with consumers preferring an intermediate level of

stimulation (e.g., Anand and Holbrook 1986; Kellaris 1992; Dubé, Chebat, and Morin 1995). However, as shown by Lacher (1989), there may be different types of responses, such as a sensory, image, emotive, or analytical response. It is the overall combination of responses that influences the need to re-experience the music and consequently the intention to purchase the music (Lacher and Mizerski 1994).

These responses are often moderated by demographic and psychographic characteristics. Given the prominent role of complexity, it is not surprising that arts attendance has been found to be closely associated with high levels of education and arts training (Andreasen and Belk 1980; Bhattacharya, Rao, and Glynn 1995). But also other variables have been found to influence hedonic response, such as gender and age. Lacher (1994) finds that males have a stronger analytical response, whereas females have a stronger sensorial response. Females have also been found to respond more positively to music at lower volumes (Kellaris and Rice 1993). Holbrook and Schindler (1989) show that preferences for popular music styles and pieces are age related. Music coming on the market when consumers are in their mid-twenties is likely to remain the most favorite music in later life. Subsequent research shows that the idea of a formative period extends to other forms of entertainment and that it is strengthened by psychographic variables such as "attitude towards the past" (Holbrook 1993; Holbrook and Schindler 1994).

Subsequent market characteristics

In mainstream marketing and consumer behavior literature, endured sensory stimulation has been found to cause sensory satiety (Inman 2001). Consequently, the more pronounced the hedonic or sensory nature of a product category, the more consumers exhibit (intrinsic) variety seeking (Van Trijp, Hoyer, and Inman 1996). Surprisingly, most research into variety seeking has focused on experiments with (snack) food. Ratner, Kahn and Kahneman (1999) is one of the few studies using music. The authors find that the need for variety is so strong, that consumers will even choose less preferred songs over preferred songs for the sake of variety. Such satiety may be forestalled by offering a more multisensory product, such as music video instead of just music (Goldberg et al. 1993).

To address consumers' need for novelty and variety, there is an abundant, continuous supply of new, unknown products in arts and entertainment. As a consequence, the market of arts and entertainment is marked by a number of particular characteristics:

- *The role of critics.* As new products also entail risks, reviews may help in predicting the likely outcome of consumption. The role of critics has featured prominently in research, although there are mixed results as to their actual influence (Basuroy, Chatterjee, and Ravid 2003; Eliashberg and Shugan 1997; Holbrook 1999). As shown by Holbrook (1999), consumers rely on different criteria than experts. When people use a critic in aiding what to choose, they face the extra task of selecting the right critic as source of information. In a series of experiments Gershoff, Broniarczyk, and

West (2001) show that consumers frequently select inferior sources and products because of a failure to recognize when to rely on whom. When consumers rely on reviews, they will attach more belief to it the more deviant the review from what is expected from the critic (Astous and Touil 1999).

- *The importance of collaborative filtering and product presentation*. With the rise of the internet, another source for advice has emerged. Many sites selling arts and entertainment products (e.g., amazon.com) aid in selecting a consideration set from the copious choice of products and in advising on the most appropriate product. Apart from research developing models for offering consumers the right selection such as collaborative filtering (e.g., Ansari, Essegaier, and Kohli 2000), authors have also investigated how presentation of products in recommendation systems influences evaluation (Cooke et al. 2002) or which place and heuristics consumers use to select a book or music cd (Zauberman 2003).
- *The use of multiple channels and/or sequential distribution*. As many entertainment products can easily be distributed through multiple channels, companies may use specific channel strategies to make the most out of the relative short life cycle of pop songs or movies. In popular music, multiple channels like radio, tv and tours are used simultaneously to gain maximum exposure and profit. However, although MTV leads to increased awareness over radio, its differential effect on affect and intention are less clear (Baldwin and Mizerski 1985). In movies, sequential distribution is the prominent strategy to maximize profits. Consumers differ across channels in movie involvement (Garlin and McGuiggan 2002) and the choice for a particular channel is based on a rational trade-off of price versus the importance of newness (Basil 2001). Lehman and Weinberg (2000) show how to determine the optimal time to enter the second channel and how information about the first channel provides information about expected sales in the second channel.
- *Bundling of products*. In order to secure sales, many performing arts venues offer bundles of performances (subscription packages). A number of authors have investigated how suppliers should price such bundles (Venkatesh and Mahajan 1993; Ansari, Siddarth, and Weinberg 1996) and how consumers react to such bundles, in particular whether they will attend all performances. A series of experiments show that consumers are more willing to forgo if or when they have a windfall (Soman and Cheema 2001) and multi performance ticket holders are more likely to forgo an event than a single performance ticket holder (Soman and Gourville 2001). These reactions also depend on whether the theater event was to be attended with a friend or alone (Woodside and Singer 1994).
- *Forecasting demand*. Starting in the late 1970s, this theme has continued to attract substantial research attention. The focus of later applications switches primarily to the movie industry. Movies are multi billion dollar investments whose success is often determined on a single (opening) night or weekend. With many introductions failing,

insight into determinants of success is of great relevance. Apart from the channel applications mentioned earlier, authors have addressed questions such as how to predict demand early on (Sawhney and Eliashberg 1996; Eliashberg et al. 2000), when to enter the market (Krider and Weinberg 1998), when to enter foreign markets (Elberse and Eliashberg 2003; Neelamegham and Chintagunta 1999), how to distribute movies across available screens (Jones and Ritz 1991; Swami, Eliashberg, and Weinberg 1999), or how quickly demand for a movie decays (Jedidi, Krider, and Weinberg 1998). Notwithstanding the prominence of movies, theater applications continue to appear (Reddy, Swaminathan, and Motley 1998; Weinberg 1986). Since recently, modeling interest has also extended to music cd's (Moe and Fader 2001; Moe and Fader 2002).

- *Network externalities*. The need for variety/novelty has implications for the introduction of new technologies as well. New "hardware", such as a cd-player, dvd-player or game console, will only gain market acceptance if there is a large supply of "software". Technology based entertainment is therefore an attractive field to study network externalities (e.g., Basu, Mazumdar, and Raj 2003; Nagard-Assayag and Manceau 2001).

1.3.2. Symbolic/fantasy aspects

Apart from their sensory nature, arts and entertainment are also highly symbolic products. They contain many different references to elements of everyday life and society, both at an abstract (art) and concrete (entertainment) level. A number of authors have specifically investigated the many different meanings instilled in arts and entertainment products, such as in television series (Hirschman 1988), movies (Holbrook and Grayson 1986), comics (Spiggle 1986), museums (Umiker-Sebeok 1992), heritage sites (Goulding 2001) or artists themselves (Bamossy 2005).

McCracken (1986) proposes that meanings in products result from an active process of negotiation between society, producers and consumers, whereby advertising and fashion systems give meanings to products and consumers, using rituals, extract meaning from products. Hogg and Banister (2000) show how this model applies to the music industry and how youngsters use and consume the meanings imbued in rock music. In a large scale qualitative analysis of Star Trek fandom, Kozinets (2001) investigates the different meanings its fans derive from, but also add to the original product, highlighting the independent role consumers have in negotiating meanings from mass media when constructing a sense of self and what matters in life.

Subsequent market characteristics

In general, the luxurious and/or superfluous image of arts and entertainment leads to specific choice behavior. For instance, Dhar and Simonson (1999) show that when entertainment choices are combined in an evening (theater and dinner), consumers will

either choose an expensive version of both of them or a cheap version of both of them; consumers will try to balance complementary choices. Similarly, in investigating the consequences of a violated goal on subsequent choices, Soman and Cheema (2004) find that consumers who didn't get to their savings target were more willing to spend on (luxury) theater/music tickets that people who could still get to their target.

The symbolic nature of arts and entertainment products may also be used as an expression of a more specific identity and at different levels. First, arts and entertainment can be expressions of national culture and identity. For instance, many countries are the source of a (popular) music genre and are readily identified with it, such as Jamaican reggae music (Olsen and Gould 1999) and Hawaiian folk music (Schroeder and Borgerson 1999). But also national arts treasures and arts activities may be viewed as primary characteristics of a country (Combes et al. 2001). Second, they can be expressions of particular subcultures; particularly music is often used as such (e.g., Blair and Hatala 1992). Third, on a personal level, arts and entertainment, may aid in constructing an identity (Kozinets 2001; Russell, Norman, and Heckler 2004), in expressing an identity, such as through preferences listed on websites or displayed through collections of books, cd's or dvd's at home (Schau and Gilly 2003), or in sharing an identity with friends, as it may have specific meanings for maintaining social relationships (Gainer 1995).

Also many companies, in marketing their products, make use of the symbolic properties of arts and entertainment. A common example is the use of the symbolism of a particular piece of music in advertising, to support the overall message (e.g., Scott 1990). Some authors have gone one step further and even proposed an amalgamation of marketing and retailing strategies with entertainment, mostly notably the movie industry, as a factor for commercial success (Hannigan 1998; Wolf 1999; Montgomery and Pasnik 1996; Holbrook 2000; Fraim 2000). Examples of cross-over strategies mentioned are theme-based retail settings such as Hard Rock Café or Planet Hollywood; toy figures such as the Disney characters in the McDonalds' Happy Meals; cartoon characters that act as interactive product spokes characters in marketing to children; and a host of merchandizing and paraphernalia.

Bordering on the use of entertainment symbols is the application of celebrity endorsement; a subject that has attracted a fair amount of attention in marketing and consumer behavior research (see McCracken 1989 for a critical overview). Whilst the realm of celebrity extends well beyond arts and entertainment to include different fields such as sports, politics or lifestyle, many artists, performers and actors have featured prominently in advertising. Bamossy's (2005) in-depth study of Van Gogh provides many examples of how a single artist may be used extensively to sell a variety of products.

1.3.3. Emotive aspects

Marketing and consumer behavior research into the emotive aspects of arts and entertainment has been scant; certainly compared to the attention devoted to its sensory and symbolic nature. Only Baumgartner (1992) investigates why and how music becomes associated with events in people's lives and may trigger which emotions. Market applications of emotive aspects focus particularly on the role of background music, either as short term mood inducement, in retail/service settings, or as long term affect inducement, as part of a commercial (Bruner 1990; Groenland and Schoormans 1994).

In retailing, music can be used to create an agreeable atmosphere. For instance, Grewal et al. (2003) and Mattila and Wirtz (2001) find that music enhances store evaluation and consequently influences impulse buying behavior and patronage intentions. This effect is stronger when combined with other, congruent, stimuli such as scent (Mattila and Wirtz 2001). As shown by Hui, Dubé and Chebat (1997), in service environments (positive) music also triggers a more positive emotional reaction to waiting for services. This may in part be caused by the influence of musical tempo on perceived waiting time (Oakes 2003). In addition, music may influence time spent on the consumption of products, such as in a restaurant, and consequently on the amount of money spent (Caldwell and Hibbert 2002).

In processing commercials, music supporting the visual events helps to accentuate the advertising proposition (Kineta 2001). Also, music aids in remembering the ad later on, increasing the likelihood that the product will be included in a consideration set (Stewart and Punj 1998). However, for music to have an effect, often more than just a single exposure is required (Kellaris and Cox 1989). Additional research has found such effects to be also moderated by music format (Sullivan 1990), attention gaining value and music-message congruency (Kellaris, Cox, and Cox 1993), tempo and familiarity of the music (Hahn and Hwang 1999), instrumental versus vocal versions of popular music (Roehm 2001), and cultural differences (Tavassoli and Yih 2003).

1.4 Research related to arts and entertainment

Common denominator of the research of the second period is that particular characteristics of the arts and entertainment market are leading the research focus. In addition, a number of authors have used arts and entertainment as a research modus or territory for other reasons.

1.4.1. Arts and entertainment as research source

As much of arts and entertainment is – either abstract or realistically depicted – containing elements of everyday life, it has been used as a source of information about consumer culture. In humanities, paintings have been an important source of information about historical periods, alongside written sources. Such an historical research may include the consumer culture of those times, as in Ger (1999) and Witkowski (1999). Ger (1999)

examines late Ming Chinese consumer culture, and Witkowski (1999) uses the art work of two American painters as a source for understanding how consumption and domestication worked in the 19th century. But also in researching contemporary consumer culture, where the object of research can still be observed directly, works of art and entertainment may also be a viable source of information. For instance, Hill (1990) studies AIDS and its victims as they are depicted in the visual and performing arts and discusses the implications of this portrayal on opinions and attitudes within society. Meamber and Venkatesh (1999) investigate a selection of performing arts to see how the body is portrayed and used, and what this tells us about consumers' relationships with their bodies.

1.4.2. The use of arts theory to understand marketing phenomena

Rather than applying marketing and consumer behavior theory to understand the arts, art theory can also be used to understand marketing and consumer behavior. Most prominent example is the use of literary criticism as a source for understanding consumer stories and advertisements (Stern 1989). Two schools of thought have been suggested in particular: genre criticism (Stern 1994; Escalas and Stern 2003; Stern 1995) and reader-response criticism (Stern 1993; Scott 1994). Central to genre criticism is the notion that stories can be understood as a taxonomy of groups of related stories. The taxonomy can be based on formal criteria or a set of archetypes or myths that are the basis for all other stories. Stern (1995), for instance, applies Frye's four categories of myths (comedy, romance, tragedy, and irony) to analyze consumption stories. Where genre criticism focuses on texts themselves, reader-response criticism studies the reading of the text. In this view, genres as collective conventions may play a role in mediating expectations from readers, but many other conventions are also proposed to influence perception. Stern (1993), for example, introduces post-modern feminist literary criticism to point out typical male and female values portrayed in advertisement stories.

1.4.3. Arts and entertainment as a convenient research territory

Finally, several studies use arts and entertainment simply as a convenient or accidental research setting. Most prominent is the use of this field in services marketing, as many of the products in arts and entertainment are intangible products, delivered live to the consumer. For instance, De Ruyter, Wetzels, Lemmink and Mattsson (1997) show how the different stages of the service delivery process in a museum lead to value creation and overall satisfaction judgments; Garbarino and Johnson (1999) assess the different roles of satisfaction, trust, and commitment for low relational and high relational customers of a theater company; and Garbarino and Johnson (2001) use the same setting to show that the consumers' goal influences the appreciation of various attributes of the service and hence differently evaluate overall satisfaction and product usage. Following on the work of Garbarino and Johnson, Ngobo (2005) shows that for theater customers, service

perception only influences the repeat purchase decision, not the decision to migrate downwards (i.e. from subscription to single tickets). Also, the service environment characteristics have been researched in an arts and entertainment context, such as the role of other consumers (Marquis and Filiatrault 2002) and tangible elements of the physical environment (Wakefield and Blodgett 1999).

Examples of other studies that have used arts and entertainment as convenient research settings include the use of museum membership by Bhattacharya, Rao and Glynn (1995) and Bhattacharya (1998) for research into organizational identification; the use of Star Wars by Brown, Kozinets and Sherry Jr. (2003) for research into retro branding; or the use of movie stars by Derbaix and Sjoberg (1994) to investigate the differences between similarity and preference.

1.5 Conclusion and comments

The aim of this introduction was to show why so many authors in marketing and consumer behavior research have studied arts and entertainment in particular. Whilst this overview by no means is claimed to be exhaustive, it may serve as a good illustration of the size, depth and variety of marketing and consumer behavior in arts and entertainment.

After an initial period of 'testing the water', arts and entertainment have developed into a rich, full-grown research area. Illustrative is the comparison between one of the earliest studies, Ryans and Weinberg (1978) and one of the latest studies, Ngobo (2005), both of whom investigate single ticket buyers versus subscription holders. Whereas Ryans and Weinberg (1978) simply describe differences between the two segments in terms of socio-economic variables, Ngobo (2005), investigates migration between the two segments and connects this to constructs such as service perception. Particularly the second period shows that, rather than just a prestigious research object, the specific characteristics of arts and entertainment raise a number of challenging research questions that may be addressed from a wide variety of angles. In particular, the literature review highlighted three key characteristics:

- They are highly sensory products, resulting in a strong need for variety and novelty, and as a consequence, a continuous, large supply of new products with often short shelf lives and varying degrees of success. The dynamics of such a market pose particular strains on both consumers, who need more help in their choice process, as well as suppliers, who need instruments to sell their goods timely.
- They are highly symbolic products. Apart from the effect of their general luxury or superfluous image on choice behavior, specific symbolic properties of arts and entertainment products aid in constructing the identity of countries, sub groups, individuals and brands.
- They are emotional products. Particularly music has been found to aid in creating a conducive atmosphere and in affective positioning of products and organizations.

1.6 The focus of this research

Aim of this research

This research is based on the first of the three key characteristics of arts and entertainment outlined above: the sensory nature and the resulting strong need for variety and novelty. As discussed above, the consequential continuous, large supply of new products with often short shelf lives and varying degrees of success pose particular challenges to marketers in this field. The aim of this research is:

To help arts marketers address the challenges arising from the consumers' need for variety and novelty.

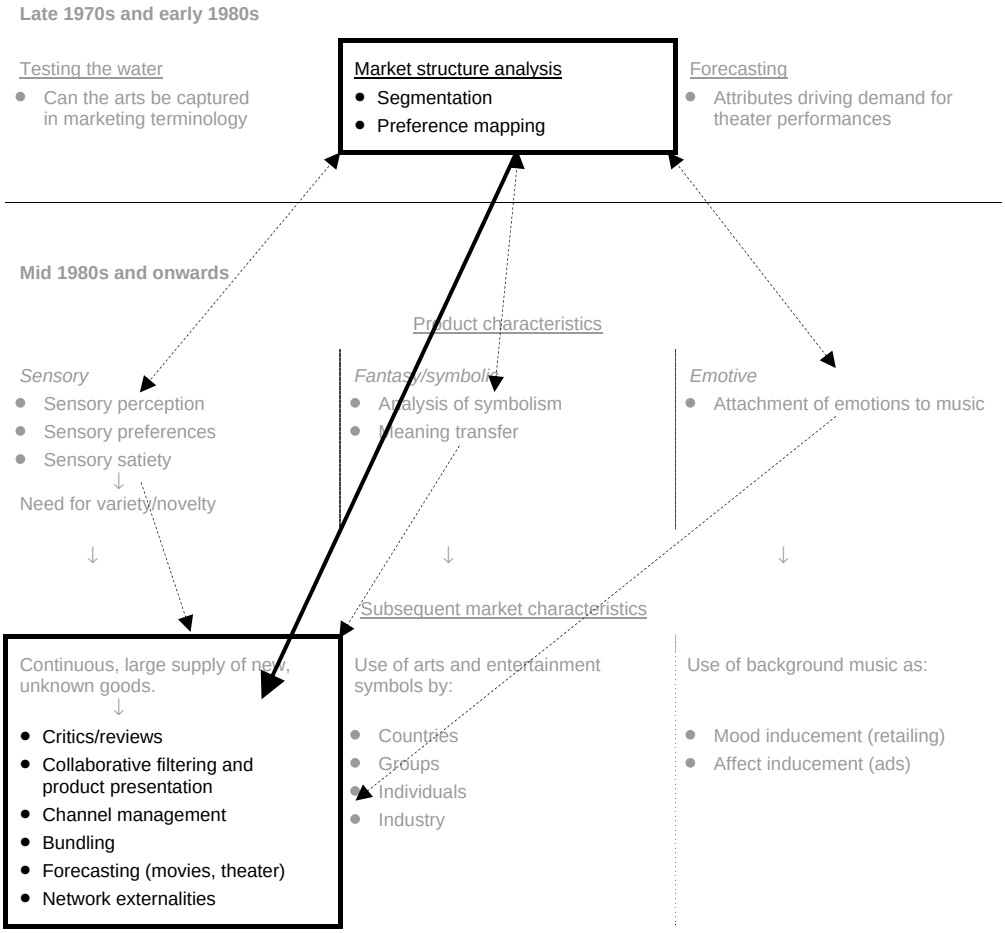
Paragraph 1.3.1 mentioned some of the instruments arts marketers use to address the challenges, such as bundling (e.g., subscription packages) to encourage cross sell, or structure product presentations like collaborative filtering to guide customers through the large supply. As remarked in the marketing literature (e.g., Brodie and Danaher 2000), the effective use of such instruments relies on the existence of and insight into a market structure[2]. For instance, bundles are only attractive if most of the components satisfy the same group of consumers. Consumers will reject entire bundles if they only like a few of the included products; and bundling would thus hinder rather than improve sales. Similarly, structured presentations or expert reviews of new products are only useful when matching the attributes consumers use in their choice process. Key premise of this research, therefore, is that arts marketers may be helped in applying instruments more effectively by developing simple and efficient methods for gaining insight into customer based market structures (table 1.2, indicated by the bold arrow).

Research questions

With the advent of new generations of box office and library loan systems, the question how arts marketers can simply and efficiently gain insight into customer based market structures has become a very topical question. Increasingly, such systems not only print tickets, but allow the registration of client name and address, linking personal data with sales data. This allows precise tracking of choice behavior in art and entertainment venues (Prochak 1996). A number of authors have pointed to the opportunities this creates for marketing practice in this sector (Kotler and Scheff 1997; McCart 1992; Prochak 1996; Rawlings-Jackson 1995; Tomlinson 1992; 1993; 1994). However, so far no marketing or consumer behavior research in arts and entertainment has made use of such transaction data. Also in marketing practice, applications using individual transaction data are sparse, as most arts marketers lack the knowledge how to use this resource to their advantage.

[2] Note, as remarked earlier, that while the term "market structure" has a broader meaning in economics, in this thesis it refers to its specific meaning within marketing (as in, e.g., Day, Shocker, and Srivastava 1979).

Table 1.2 The position of our research



Of course, transaction data do not provide a perfect picture of consumer choice behavior and should consequently be judged critically on its merits. Some of the caveats that can be recognized a priori are:

- Transaction data often lack information on the socio-economic background of customers or on the motivations for choices. While some findings may seem readily interpretable, care should be taken in making inferences.
- The consumption of arts and entertainment is often a social process, the outcome of which may represent a compromise with the guests that have accompanied the purchaser. In most cases, neither the composition of the parties nor the process of compromises leading to the actual choice are known.
- The value of transaction data strongly depends on the accuracy of the registration process. For instance, most box office systems do not use a customer card, but require staff to ask for a name and address. When such client data are not registered carefully, the system may fail to recognize a returning client. On the other hand, joint use of a library card may wrongly indicate a heavy user with broad interests.
- Transaction data contain no information on satisfaction with the choice. Past choices do not necessarily imply that the customer actually liked the products; some may actually have been an erroneous, regretted choice. This is particularly true in arts and entertainment, where there is often little possibility for any “try before you buy”.
- Not all use or users are registered. For instance, when visiting museums, foreign tourists or occasional visitors are unlikely to hold a Museum Card. Public libraries may also be used for reference (which often requires no identification) instead of borrowing titles. Also, transaction data do not show potentially new segments.
- While analyses of transaction data suggest that choices were made within the particular supply of one organization, the actual choice may have been between products of different providers. For instance, rather than a trade-off between two ballet performances, the real choice may have been between a ballet performance and a movie. As most transaction systems in the cultural sector are not linked, it is difficult to assess choices in a broader context.

On the other hand, however, it is a convenient, unobtrusive form of data collection that allows for the investigation of patterns in actual behavior while – particularly compared to surveys or experiments – the size of such datasets better allows for the investigation of post hoc heterogeneity. Also, important in a sector where marketing budgets are very low, these data are already available, potentially saving money otherwise spent on market research. We believe that – in addition to other forms of market intelligence – such transaction data may be a valuable tool in gaining insight into market structures and thus may contribute to addressing the challenges arising from the continuous, large supply of goods. Central research question in this research, therefore, is:

What insight into (customer based) market structures in arts and entertainment may be gained from transaction data?

In exploring this central research problem, we see four specific research questions:

1. *What are appropriate methods for analyzing these transaction data?* For instance, while there is a body of methodological literature on market structure analysis, these methods are rarely suited for large arrays of products.
2. *What clusters or dimensions among consumers and products can be derived from transaction data?* Following Day, Shocker and Srivastava (1979), we investigate whether a behavioral segmentation of consumers is possible and whether choice patterns show some common structure.
3. *What are possible explanations for these patterns?* While transaction data contain no information about motivation or choice process, we will try to interpret the patterns and propose explanations. Whilst interpretation should be done with care when only knowing the actual choices, insight is enhanced when the revealed market structures can be understood in terms of constructs driving those market structures. Research findings on the sensory, symbolic or emotive aspects of arts and entertainment may help in this. Note that, on the other hand, market structures may vice versa also contribute to more insight into the sensory, symbolic or emotive aspects. (indicated by the arrows with dotted lines in table 1.2)
4. *How can transaction data be used to address the marketing challenges in this field?* Rationale for our research focus is that market structures may help in addressing marketing challenges. We will try to suggest specific applications for our findings specifically, as well as for the use of transaction data in general.

1.7 The structure of this research

We address these questions in a series of four studies. The first, preliminary, study investigates whether choice behavior in this field can be captured at all in a behavioral segmentation (question 2) and how (question 1). In the next three studies, we focus more specifically on three arts sectors currently having the kind of transaction data that allow tracking of choice behavior and differing in the challenges arising from the large supply:

Public libraries: supply concentrations in time and space
In the sectors of public libraries and video rental stores, consumers are often able to access a large part of the available supply at one particular location close by. Unlike museums, there is rarely a need to travel across the country and compared to theaters or concert halls, the available supply is far less spread out in time. Marketers are particularly faced with the question how to present the abundant supply in a structured way that matches consumer perceptions and search heuristics. Here, knowledge of choice patterns may help in structuring the presentation. We show how a combination of latent class analysis and ultrametric trees may be used to derive segments of consumers and their choice patterns (question 1). Results show a clear categorization (question 2) that may help in structuring the presentation of the large supply (question 4). These results suggest that values and identification with particular settings play an important role in the choice for story based entertainment (question 3).

The performing arts: supply spread in time
In the performing arts supply is mostly spread in time, with a very short shelf life for individual products, as the need for a large supply leaves little room for each performance. Since existing customers are considered to be the best prospects for new products (Kamakura, Ramaswami, and Srivastava 1991), this is typically a situation where cross-sell applications like direct mail can play a major role (question 4). Here, marketers are particularly faced with the question which customers of which genre should be approached for another genre. We introduce recent findings in neurophysiology that indicate that some people are more auditory and others are more visually dominant (question 3). We show that choice patterns in the performing arts match these findings (question 2).

Museums: supply spread in space
In the museum sector, the consumer choice set is spread mostly geographically. Whilst museums try to encourage repeat visiting by putting on temporary exhibitions, it is not uncommon in museum visiting to seek variety by visiting different museums. As we will show, the uneven distribution of consumers and museum across the country require specific methods to analyze visiting behavior (question 1). While here, marketers are particularly faced with the question how far consumers are willing to travel to satisfy their need for variety, we will position this study as a public economics paper, to show that analysis of revealed preferences may also prove to be a valuable source in related fields (question 4). The results suggest that characteristics of both the museum and the environment influence the choice to visit a particular museum (question 3); segments differ in the role of the characteristics (question 2).

In a final chapter, we will reflect on the findings of these studies and suggest avenues for further research. The structure of this thesis is summarized in table 1.3:

Table 1.3 Overview of this thesis

	Chapter	Purpose/contribution
1.	Introduction	• Show why arts and entertainment have attracted so much research interest in marketing and consumer behavior. • Motivation and positioning of this research.
2.	Segmentation of arts consumers	• Show how choice patterns can be used for *post-hoc* segmentation. • Show that arts consumption, with a heterogeneous and potentially capricious choice behavior, can be captured in a clear segmentation.
3.	Market structure in public libraries: *User categorization of public library collections*	• Show how choice patterns can be used to structure the presentation of a large supply.
4.	Market structure in the performing arts: *Individual differences in sensory modality dominance and product choice*	• Show how choice patterns can be used for cross sell lead generation. • Show that neurophysiological theory on individual differences in sensory modality dominance is reflected in performing arts choice patterns.
5.	Market structure in museum visiting: *Comparing competing cultural organizations using travel time*	• Show how choice patterns can be used to analyze spatial competition. • Show how travel time may be used to compare the use value of competing cultural organizations. • Show that transaction data are also of interested in a related field.
6.	Conclusions and discussion	• Final conclusions. • Limitations; recommendations for further research. • Managerial implications.

2. Segmentation of Arts Consumers

First, we report on a preliminary study investigating whether choice behavior in arts and entertainment exhibits any structure at all, given the diversity of tastes and the different need states consumers may have at different times. Also, as previous literature suggests that particular methods are more suitable than others in this field but fails to specify which method is most appropriate, we make a case for one specific method. We propose latent class analysis as an appropriate method for segmenting arts and entertainment consumers and illustrate its application with library loan data. In spite of the potential diversity of tastes and different need states consumers may have at particular moments, results show a clear segmentation. However, some segments are found to be better separated than others, underscoring the need for a clustering technique that takes classification uncertainty into account.[3]

2.1 Introduction

Market segmentation has been a central concept in both marketing theory and marketing practice since its introduction by Smith (1956). It has become a necessary perspective of the market for any organization to provide an optimum match between the increased flexibility of production and the needs of more or less homogeneous groups of consumers (Wedel and Kamakura 2000). However, in spite of the importance of segmentation to marketing, only a few studies have empirically investigated the existence of homogeneous groups among consumers of arts and entertainment. In addition, most of these studies look into differences between a-priori defined segments, in particular visitors versus non-visitors (Peterson 1992; Belk and Andreasen 1980; Verwey 1992; Walshe 1992), consumers in different stages of adoption (Andreasen 1992) or heavy users versus light users (Semenik and Young 1980). Rare examples of a more exploratory approach are Sexton and Britney (1980).

Whilst only a few studies have looked into the heterogeneity of the markets for arts and entertainment and tried to derive segments post-hoc, no research has addressed the issue of what constitutes an "optimal" segmentation approach for consumers of hedonic goods. The following reasons urge us to pay attention to the segmentation methodology of hedonic consumers, comprising of two dimensions: the measurement of segmentation bases and the selection of segmentation methods.

[3] This chapter is based on Boter and Wedel (1999), "Segmentation of Hedonic Consumption: An Application of Latent Class Analysis to Consumer Transaction Databases", *Journal of Market-Focused Management*, 3 (3/4), 295-311. We are grateful to the Public Library in question for providing the data set

2.1.1. Measurement of segmentation bases

The non-utilitarian and multi-sensory character of arts and entertainment makes it difficult for respondents to put reasons and results of the consumption process into words. Holbrook and Hirschman (1982) suggest that introspection or qualitative in-depth interviews are well-suited to arrive at the intangible motives underlying consumption. Because of the nature of the products, quantitative research cannot validly ask respondents in a survey to explain their choice among a limited number of options presented. We argue that for behavioral segmentation studies, i.e., segmentation on what customers have chosen, the analysis of consumption histories is more likely to yield valid and consistent findings. The argument for analyzing past consumption history over attitudinal surveys is further underlined by the holistic choice strategies consumers employ for hedonic goods. Because consumers don't maximize benefit by evaluating hedonic product attributes separately (Hirschman 1983; Holbrook and Hirschman 1982; Zajonc and Markus 1982) "an hedonic outlook must involve subjects in consumption-like experiences based on real – or at least realistic – product samples" (Holbrook and Hirschman 1982). Surveys trying to have consumers trade off product attributes seem inappropriate.

Finally, the range of products and varieties in markets for arts and entertainment is very large, and much larger than in most categories of fast moving consumer goods, durables or services (think for example of the breadth of product lines in markets for books, cd's, movies and art performances), the number of available items easily exceeding 50. Simulating such a variety in surveys or experiments poses insurmountable problems, because the range of products has to display a sufficient amount of variety. In addition, in most categories of hedonic goods there is limited or no repeat purchase among the many items available (for example, CD’s, concerts, and books are mostly only bought once). The large number of items coupled with the lack of repeat purchasing, however, poses problems to the use of purchase histories of items as appropriate segmentation bases. Therefore, we here propose to use the purchase incidence of categories of arts and entertainment products across some time horizon as a segmentation base.

2.1.2. Segmentation methods

Empirical studies into choice behavior into arts and entertainment, report "a complex matrix of behavioral characteristics for people attending events" (McCart 1992). The heterogeneity of choice behavior in this field has been linked to differences in personality (Cooper-Martin 1992; Holbrook and Hirschman 1982) and life style (Andreasen and Belk 1980). It has also been suggested that choice behavior is heterogeneous even at individual level, since hedonic choice behavior can be very situation dependent (Holbrook and Hirschman 1982).

Since many factors may affect the actual choice of a hedonic product, the appropriate basis for segmentation is a consumer’s pattern of choice. The choice probability reflects uncertainty in the transformation of the utility of hedonic products to

actual choice, due to unmeasured factors such as situational effects (cf. Ben-Akiva and Lerman 1985). In addition, such choice probabilities reflect consumers switching behavior among hedonic goods.

Then, for arts and entertainment products, the probability of combining products within a certain period of time simply equals the product of those probabilities. Thus, if a consumer has a probability of choosing product *i* of p_i and of product *j* of p_j, then under conditions of independence, the probability of choosing both products within a certain time frame equals $p_i p_j$. Thus, an effective approach for market segmentation of hedonic goods should involve the estimation of those choice probabilities in addition to deriving homogeneous segments. Such a segmentation approach should account for the uncertainty of classification of consumers to segments, caused by factors affecting the choice behavior as listed above.

Several authors (Andreasen and Belk 1980; Holbrook 1980; Holbrook and Hirschman 1982) conclude that multivariate classification techniques are the most appropriate in this field, since those derive segments post-hoc. Unfortunately, none of these authors specifies which technique would be best suited.

The method we propose to use for segmentation of consumers of hedonic products on the basis of their recorded choice behavior is mixture modeling (or latent class analysis). The applicability of finite mixture models to segmentation on the basis of choice behavior was first recognized by Poulsen (1990) and Grover and Srinivasan (1987), see also Wedel and Kamakura (2000). However, while these authors analyze switching behavior based on cross-classification of purchases at consecutive time periods, we analyze the joint choice probability of a category of hedonic products across a certain time horizon. Here, X_{ni} denotes whether or not subject *n* has chosen *i* in that period. It thus reflects incidence or penetration rather than purchase frequency.

If we assume the existence of *S* segments, with prior probabilities π_s, $\Sigma\pi_s=1$, while there are $i=1...I$ hedonic products in a category with purchase probabilities p_{is} in segment s, then the mixture model is formulated as:

$$p_n = \sum_{s=1}^{S} \pi_s \prod_{i=1}^{I} p_{is}^{X_{ni}} \qquad (2.1)$$

With p_n the probability of observing the entire incidence history of subject *n*. Thus, the finite mixture model has the property that conditional upon a segment, choices are independent, which is called local independence. The latent class model identifies segment specific need patterns through the estimated product incidence probabilities per segment. In addition, the latent class model provides us with the posterior probability of membership of each individual to the segments:

$$\pi_{ns} = \frac{\pi_s \prod_i p_{is}^{X_{ni}}}{\sum_s \pi_s \prod_i p_{is}^{X_{ni}}} \tag{2.2}$$

where X_{ni} is an indicator variable, indicating whether product *i* was chosen by subject *n*. If the latent class model is applied to a customer transaction database those posterior probabilities identify for each subject to which segment s/he belongs, and enable direct marketing efforts to be targeted, based on ZIP or other postal code information. Thus, these posterior probabilities constitute very useful statistics in the context of database and direct marketing.

In order to investigate the separation of the segments we compute the entropy of classification, which is defined as:

$$E_s = 1 - \frac{\sum_{n=1}^{N} \sum_{s=1}^{S} p_{ns} \ln p_{ns}}{N \ln S} \tag{2.3}$$

E_s is a measure in between zero and one, where values close to one indicate perfect separation of segments. If values close to zero are found, this may indicate classification uncertainty.

2.2 Library loan system application

We choose a library loan system to demonstrate the segmentation approach. In comparison to other forms of hedonic consumption, the borrowing of library books is of particular interest as object of research since:

- Most library books do not require a certain amount of training or expertise before they can be enjoyed, such as some art forms. This facilitates situational heterogeneity and makes this sector one of the most likely for this heterogeneity to be an issue.
- Library books represent a broad range of complexity from high literature to simple pulp fiction. Incidence patterns across such a broad range of products are likely to reflect independent consumer needs.
- Price and other marketing mix variables play no role in the choice of library books. Possible charges for lending books are the same for every book and advertisement and distribution is likewise identical. Thus in our latent class model there is no need to include such effects.
- Library books attract a much broader range of consumers as compared to other hedonic goods such as the arts, which is likely to result in substantial heterogeneity to occur in this market.

- Reading is a solitary pastime that thus has less social influences than those associated with more conspicuous forms of hedonic consumption of arts and other hedonic goods, which enhances the use of estimated choice probabilities as indicators of personal needs.
- Given the broad range of books available, the availability of multiple items of a single book and the large time span of data available, the influence of out-of-stock situations and other distribution effects is negligible, while repeat-loans tend not to occur.

The public library in this study is located in a small town in the middle of The Netherlands. As its coding system has changed several times over the years, it was decided to limit the data on loans to one full and unaffected calendar year, 1996.

Library information systems are typically composed of one record for each customer-transaction. At each transaction, the customer identification number is entered along with the time and data and the identification numbers of borrowed books. This information is stored in a database that can be accessed by client and book number. Most libraries will, apart from name and address data, also include date of birth in this database as some age groups are eligible for free membership or discounts. Other (socio-demographic) customer data are generally not available. The library automation system furthermore has features to identify and report overdue loans, and produce summary statistics over certain periods (month, year). For this research project, the loan data and personal data were merged into one flat file with one row per client and variables which 52 dummy variables for the category codes (thrillers, novels, poetry, etc., see table 2.2) to indicate whether any books in such a category were borrowed in 1996. In addition, gender, age (8 categories, table 2.3), total number of books borrowed in this year (5 categories, table 2.4) and place of residence (3 categories, table 2.5) were available. Finally, the database included client number and ZIP code, potentially useable for tracking individual clients. The final data set contained 7,359 active borrowers.

2.3 Results

The data set was analyzed using a special version of PanMark (Van der Pol, Langeheine, and De Jong 1991), adapted by the one of the authors of the program to accommodate large data sets with up to 60 indicators. Solutions for two to ten latent classes were generated with 100 random start values per solution to avoid local optima. The Akaike Information Criterion (AIC) is equal to $-2\ln(L)+2p$ where L denotes the likelihood of the model and p the number of estimated parameters. Model selection can be based on this criterion by choosing the one with the lowest value. Related to the AIC are the Bayesian Information Criterion (BIC) and the Consistent Akaike Information Criterion (CAIC) (Bozdogan 1987; Schwartz 1978), which put a higher penalty on adding coefficients to the model. Both AIC, BIC and CAIC continuously decreased over the number of segments. Therefore, bootstrapping was used to determine the significance of the Likelihood ratio

and Pearson chi square (Wedel and Kamakura 2000), indicating a solution of eight latent classes (table 2.1):

Table 2.1 Comparison of the first eight LCA models

# classes	df	BIC	Log likelihood ratio	Bootstr. Sign.	Chi-square (x 10^{10})	Bootstr. Sign
2	7254	203238.64	98764.74	0.00	190953628632100	0.00
3	7201	197759.25	92813.30	0.00	9614132269	0.00
4	7148	194154.55	88736.72	0.00	364791987	0.00
5	7095	192999.81	87110.13	0.01	3963080	0.00
6	7042	192012.06	85650.52	0.05	2908818	0.00
7	6989	191472.55	84639.05	0.04	618340	0.02
8	6936	191167.89	83862.45	0.19	268869	0.12

Segments were profiled with consumer demographics by computing the percentages of people in each segment falling into particular classes of these variables. The result is presented in table 2.2 (see next page). The eight segments show clear and distinguishing patterns of borrowing behavior. Before labeling the classes, we first explore the typology by profiling the posterior probabilities of class membership with the remaining variables for description.

2.3.1. Age

Age is a particularly powerful predictor of segment membership, as we can see in table 2.3. The segments have a very distinct age distribution:

Table 2.3 Latent classes and age distribution

Age	**S 1**	**S 2**	**S 3**	**S 4**	**S 5**	**S 6**	**S 7**	**S 8**
-12	**85.5**	**33.1**	0.4	0.2	0.7	0.0	0.0	4.8
13-15	11.1	**34.3**	6.3	2.8	3.2	1.0	1.7	10.4
16-20	1.3	8.8	**38.0**	9.8	7.0	3.4	10.1	19.3
21-30	0.4	4.9	4.6	17.3	10.5	10.5	8.7	15.2
31-40	0.8	9.2	6.5	**22.6**	15.8	17.2	20.2	15.8
41-50	0.6	7.3	12.4	**25.5**	14.7	**21.5**	**28.9**	15.1
51-64	0.2	1.2	15.0	15.4	18.9	**22.9**	19.7	9.7
65-		1.2	16.9	6.4	**29.2**	**23.5**	10.7	9.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The first two segments, both high on borrowing reading children books (table 2.2) are further distinguished because of their age difference. The second segment is somewhat older and, as table 2.2 shows, is more likely to borrow CD's or non-fiction books. Segment 5 from table 2.2 that scored high on easy romantic fiction turns out to be older; where as segment 3 scoring high on (complex) literature seems to consist for a considerable part of secondary school students who have to read classical literature for their exams. In general, the relationship between borrowing behavior and age is relatively clear-cut.

Table 2.2 Eight class solution LCA

	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8
size of the segment	**0.287**	**0.057**	**0.064**	**0.117**	**0.130**	**0.096**	**0.048**	**0.201**
CD 1	0.039	0.310	0.312	**0.420**	0.062	0.203	**0.532**	0.319
CD 2	0.006	0.108	0.101	0.202	0.007	0.094	0.253	0.132
novels (AG)	0.004	0.111	0.315	0.292	0.189	**0.650**	**0.753**	0.018
adventure/thrillers	0.001	0.124	0.256	0.303	0.385	**0.796**	**0.652**	0.081
detectives	0.005	0.116	0.178	0.199	0.271	**0.615**	**0.531**	0.029
war & resistance	0.001	0.072	0.117	0.052	0.126	0.327	0.217	0.026
science fiction	0.001	0.032	0.045	0.067	0.051	0.174	0.235	0.022
horror	0.005	0.038	0.042	0.041	0.052	0.167	0.181	0.019
sea	0.000	0.000	0.025	0.009	0.010	0.084	0.047	0.002
county/family saga	0.001	0.104	0.084	0.104	**0.535**	**0.688**	0.344	0.032
[unknown]	0.000	0.008	0.009	0.012	0.119	0.186	0.057	0.000
romance	0.002	0.059	0.040	0.051	0.317	0.545	0.271	0.000
historic novel	0.001	0.079	0.186	0.135	0.213	0.557	**0.491**	0.015
humoristic roman	0.001	0.056	0.064	0.061	0.064	0.243	0.240	0.010
comics	0.027	0.163	0.027	0.053	0.013	0.043	0.137	0.014
novels (AV)	0.004	0.142	0.221	0.262	0.391	**0.853**	**0.654**	0.031
literary prose	0.005	0.260	**0.838**	**0.609**	0.390	**0.827**	**0.881**	0.197
literary poetry	0.000	0.029	0.181	0.098	0.003	0.041	0.201	0.031
general	0.002	0.049	0.085	0.087	0.007	0.049	0.318	0.023
philosophy	0.000	0.011	0.057	0.197	0.000	0.053	0.343	0.025
religion	0.004	0.059	0.078	0.182	0.017	0.061	0.390	0.022
social sciences	0.002	0.051	0.056	0.182	0.025	0.127	0.337	0.032
economy	0.004	0.073	0.080	0.154	0.020	0.068	0.359	0.039
law	0.002	0.019	0.047	0.099	0.018	0.105	0.266	0.012
war	0.002	0.019	0.014	0.032	0.002	0.023	0.114	0.006
psychology	0.000	0.078	0.092	0.369	0.038	0.163	**0.640**	0.059
education	0.004	0.109	0.033	0.215	0.022	0.109	0.339	0.050
math & physics	0.009	0.084	0.130	0.190	0.023	0.109	**0.404**	0.070
biology	0.035	0.150	0.072	0.167	0.027	0.086	0.339	0.043
parenthood & guardianship	0.043	0.142	0.003	0.009	0.002	0.003	0.026	0.004
health & sport	0.030	0.260	0.154	**0.534**	0.114	0.327	**0.761**	0.139
card games & puzzles	0.003	0.058	0.020	0.072	0.017	0.080	0.162	0.021
DIY & cooking	0.006	0.168	0.089	0.329	0.070	0.273	**0.526**	0.070
pets & plants	0.046	0.147	0.067	0.266	0.065	0.189	**0.439**	0.095
technical	0.014	0.135	0.110	0.191	0.029	0.140	**0.506**	0.087
(visual) art	0.009	0.100	0.212	0.241	0.025	0.113	**0.551**	0.073
photography and craft	0.000	0.045	0.055	0.151	0.010	0.070	**0.411**	0.023
music/dance/film/etc.	0.004	0.144	0.145	0.144	0.001	0.104	0.390	0.047
language, lit. and philology	0.002	0.035	0.083	0.096	0.008	0.045	0.194	0.026
literary (extra group)	0.000	0.033	0.222	0.058	0.002	0.031	0.270	0.022
history	0.018	0.202	0.321	0.338	0.056	0.305	**0.748**	0.135
countries & people/travel	0.023	0.214	0.390	**0.558**	0.138	**0.448**	**0.803**	0.196
literary drama	0.000	0.007	0.148	0.013	0.000	0.004	0.039	0.010
lit. essays/biography	0.000	0.031	0.257	0.051	0.005	0.035	0.226	0.016
fiction youth	**0.946**	**0.947**	0.139	0.117	0.064	0.106	0.311	0.055
non-fiction youth	**0.712**	**0.803**	0.086	0.070	0.007	0.046	0.196	0.052
foreign novels	0.000	0.006	0.275	0.003	0.003	0.023	0.154	0.011
foreign adventure/thrillers	0.000	0.009	0.267	0.011	0.006	0.033	0.187	0.024
foreign detectives	0.000	0.000	0.228	0.010	0.005	0.017	0.107	0.010
foreign literature	0.000	0.004	0.271	0.007	0.011	0.041	0.157	0.005
foreign literary prose	0.001	0.017	**0.682**	0.037	0.009	0.042	0.277	0.062
large print books	0.002	0.025	0.101	0.026	0.131	0.181	0.106	0.035

2.3.2. Annual borrowing frequency

The segments were also compared on the average number of books they borrowed in 1996. The numbers of books (first column of table 2.4) were classified into 20%

percentiles. Every deviation from 20% among the classes in table 2.4 thus indicates over- or under representation. Segment 7 consists mainly of heavy users that borrow across a wide range of categories (table 2.2), where as segment 8 consists mostly of light users that occasionally borrows a CD but few of the other categories. Segment 6 is also a somewhat heavier user, where borrowing behavior seems concentrated on fiction categories. Segment 5 is a category of somewhat lighter borrowers of mainly family saga. The other segments are medium users of books. Overall, the relationship of segment membership with borrowing frequency seems quite pronounced.

Table 2.4 Latent classes and average number of borrowed books

number of borrowed books	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8
- 7	21.7	2.9	4.3	2.0	19.2	0.1	0.0	**51.0**
8 – 15	23.2	20.6	24.3	17.1	**25.5**	2.6	0.0	29.6
16 – 29	20.0	**26.9**	**27.3**	**35.3**	19.6	12.3	1.7	12.4
30 – 55	18.8	**28.4**	**29.9**	**30.6**	19.8	**32.3**	18.4	5.3
> 56	16.3	21.2	14.1	14.9	16.0	**52.7**	**79.9**	1.7
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

2.3.3. Distance

Contrary to age and borrowing frequency, the relationship with distance is rather weak. To a certain extent, distance explains the fact that segment 8 hardly reads any books (table 2.5). This type however, like all others, comes primarily from the city in question itself. Segment 7 of heavy users, more than the other types, comes from the surrounding towns, although the percentages are still low. This result basically shows that the library tends to attract more heavy readers from a wider distance, while it may be a reason for less avid readers not to go to the library if the distance is too great.

Table 2.5 Latent classes and place of residence

	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8
City	96.7	96.6	95.2	94.4	95.8	94.0	90.2	91.7
Village 1	1.4	1.7	1.3	2.2	1.8	2.4	2.3	3.4
Village 2	1.7	1.5	2.8	2.5	1.4	2.6	5.2	3.5
Other	0.2	0.2	0.7	0.9	1.1	1.0	2.3	1.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

2.3.4. Adding up the findings to a full typology

When we look at the book categories every segment borrows as well as the three descriptor variables discussed above, we can come to an interpretation of the eight segments (table 2.6). To briefly summarize table 2.6, segment 1 is a fairly large segment of young children, with a loan probability pattern that reflects the need states of their age. The same holds for segment 2, be it that this segment is much smaller, and their need for complexity seems to expand relative to segment 1 as indicated by a wider range of

categories. Segment 3 are young readers of literature, where those needs are potentially induced by the Dutch school system, where the categories in question are part of compulsory exams. Segment 4 comprises adults that are medium users and read a mix of literature and leisure categories. Segment 5 consists of older people that are relatively light users of family saga, while segment 6 tends to consist of middle aged heavier readers of fiction. Segment 7 are heavier users of a wide range of fiction and non-fiction categories, and segment 8 are light users that occasionally borrow cd's.

Table 2.6 Summary of the eight latent classes and their descriptives.

S 1: **Young child**	Borrow almost only the two youth categories: • fiction youth (94.6%); • non-fiction youth (71.2%).
S 2: **Older child**	Borrow - apart from the two youth categories - some of the non-fiction categories for grown-ups and CD's: • CD's (31%) • health & sport (26.0%); • countries & people/travel books (21.4%) • history (20.2%)
S 3: **Literature reader**	Mainly read the two literary categories: • literary prose (83.8%) • literary prose (foreign) (68.2%) Notable is the large number from the age group 16 - 20. In the Netherlands all secondary schools have Dutch and at least one foreign language as compulsory exam subject. Reading literature is part of this.
S 4: **Grown-up general**	Borrows four categories in particular: • literary prose (60.9%) • countries & people/travel books (55.8%) • health & sport (53.4%) • CD's (42%)
S 5: **Family saga reader**	Particularly reads family saga's and local stories (53.5%) and to a lesser degree other types of novels.
S 6: **Fiction reader**	This type scores high on various categories of fiction: • novels (AV) (85.3%) • literary prose (82.7%) • adventures/thrillers (79.6%) • county/family saga (68.8%) • novels (AG) (65.0%) • detectives (61.5%)
S 7: **Heavy user**	A small group of clients who borrow both fiction and non-fiction and within these two main categories many different sub-categories[4].
S 8: **Light user**	Occasionally borrows a CD (31.9%), but hardly any of the other categories

[4] Although most libraries actively discourage the use of one card by more family members, an alternative explanation for this segment might be that it actually represents multiple users of a singly card.

Latent class analysis produces meaningful segments, where the choice probabilities within segments seem to reflect independent need states. The individual heterogeneity mentioned in the literature would result in the data not providing accurate information enabling the classification of all subjects to one particular segment, thus leading to low entropy of classification (E_s). However, here, $E_s = 0.84$, indicating a good separation of segments.

To explore whether particular latent classes lead to more classification difficulty than others, the subjects were ordered by their highest classification probability across the eight classes. As children would already be easily classified based on their age, we here concentrated on the segments 3 to 8, relating all to adults. The first 25% of the customers of 18 years and older (subjects with a low classification probability for their highest grade of membership) were compared to the highest 25% (subjects with a high classification probability for a particular class) for distribution across the latent classes 3 to 8 (table 2.7):

Table 2.7 Class distribution

	More difficult to classify (distribution in first 25% of max. GOM value)	**Easier to classify** (distribution in highest 25% of max. GOM value)	Average distribution
S 3: Literature reader	8.5	**14.4**	8.2
S 4: Grown-ups general	23.1	10.8	19.2
S 5: Family Saga Reader	23.2	21.1	21.3
S 6: Fiction readers	15.4	**22.4**	16.7
S 7: Heavy users	6.0	**18.2**	8.1
S 8: Light users	23.8	13.1	26.6
	100.0	100.0	100.0

GOM = Grade Of Membership; the probability that a subject belongs to a particular segment
Values in bold: substantially higher than average distribution
Underlined values: substantially lower than average distribution

It is in particular in the highest 25% that we see clear differences in the distribution of the classes in comparison to the average distribution for the whole group. The more distinct *Literature reader, Fiction reader* and *Heavy user* segments seem to lead to less classification uncertainty than the more general *Grown-ups general reader* and *Light user*. Apparently, the choice behavior of the former is more consistent than the latter. The importance of the complexity dimension or the distinction between high culture and entertainment as mentioned earlier, could account for this as the easier reading profiles of the *Grown-ups general reader* and *Light user* can perhaps more easily be adopted by any other type of borrower, for instance when borrowing books to take along on a vacation.

2.4 Conclusion

Since recently, public libraries have started to switch from a product orientation to a marketing orientation, albeit hesitantly (Adeloye 2003; Hood and Henderson 2005; Harrison and Shaw 2004; Sass 2002). The technological developments in library loans systems may significantly contribute to the adoption of the marketing concept. So far, only a few publications in the 1990s have dealt with the potential use of library automated

systems for management decisions. Gumilar and Johnson (1995) give an extensive overview of the potential and actual use of automated library systems as a management information system, but neglect to see the potential use of these systems for marketing purposes. Ottensmann (1997) shows the potential of the zip code information in the library system to location planning. The example presented here is, to our knowledge, the only application of public library loan data for segmentation purposes.

As stated in the introduction, segmentation has been a central concept in marketing theory and practice since its introduction by Smith (1956). It has become a necessary perspective of the market for any organization to provide an optimum match between the increased flexibility of production and the needs of more or less homogeneous groups of consumers (Wedel and Kamakura 2000). As such, considering the existence of segments with different needs and the products that may address those needs is an indispensable, important start in adoption a market orientation. Indeed, in trying to facilitate a marketing orientation, the Dutch Association of Public Libraries has ordered the development of a standard model to help libraries think in terms of product-market combinations, resulting in an extensive instruction to manually classify borrowing behavior of a priori defined segments into over 200 product-market combinations (Gramser 1997). However, so far, this model has only been adopted by 25% of the public libraries and only in simpler forms (Vereniging Openbare Bibliotheken 2005). While there is little information on the background of this situation, it does suggest that public libraries have difficulty applying this model or find it too cumbersome. The results of this chapter indicate that regional public library service organizations may substantially alleviate thinking about product-market combinations by deriving a segmentation based on genre borrowing incidence from library loan systems. The application on library loan transaction data shows that borrowers of library books can be segmented well based on their choices for particular categories of books if specific cluster techniques are used; particularly those that take classification uncertainty into account.

3. Market Structure in Public Libraries: *User Categorization of Public Library Collections*

Public libraries offer most of their supply in one place at any time. As a consequence, consumers are faced with a massive choice, with particularly fiction often just arranged by alphabetical order, rather than by the needs it may fulfill. We argue for transaction data as a suitable source for inferring the consumer choice process. Such a model would help arranging the large stock to match the choice process. We identify two methodological issues in using such data: the size of choice options and how to distinguish between combinations of choices reflecting similar needs and reflecting variety seeking. We propose a combination of latent class analysis and ultrametric trees to address these issues. The results reveal four segments with each a specific structure of (an appropriate part of) the collection.[5]

3.1 Introduction

One of the main characteristics of public libraries is their large stock of titles. On average, American public libraries hold over 84,000 books and serials, and even small, local public libraries have thousands of books on offer (National Center for Education Statistics 2003). Public libraries on other continents, too, hold tens of thousands of titles on average (Fuegi and Jennings 2003). From a user's perspective, finding one's way in this plethora of choice options can be cumbersome. As a result, libraries try to guide the user by categorizing their collections into shelves for particular subjects or by pictograms on the book cover. Users do not necessarily share the librarian's professional knowledge of the field and expert heuristics for categorization (e.g., Saarti 2002). Thus, the library's categorization of titles may well differ from the users' perception or mental map of the available titles. Knowing how users perceive the collection into groups of similar titles is of obvious interest in public library collection management. Matching collection presentation with user perceptions will assist the public in finding the right titles and make the best use of the available titles. Also, it can help collection management as user categorizations may help in determining the needs of the users.

Public libraries have several sources for collecting user data on category perceptions as well as other aspects of library use. Common online and off-line techniques include surveys (e.g., Hayslett and Wildemuth 2004), log files (e.g., Yu and Apps 2000),

[5] This chapter is based on Boter and Wedel (2005), "User Categorization of Public Library Collections," *Library & Information Science Research*, 27 (2), 190-202. We are very grateful for Cubiss (formerly the Provinciale Bibliotheek Centrale Noord-Brabant) for providing the dataset and to the panel of experts who helped in the interpretation of the results.

experiments (e.g., Saarti 2002) and sorting tasks (e.g., Carlyle 1999). Library loan transaction data are rarely used. However, they have several distinct advantages. Apart from being an unobtrusive form of investigation, analysis of transaction data is more accurate than the user's perception of personal borrowing history, and it allows for the analysis of hundreds of titles simultaneously. Furthermore, given the number of users in the dataset, it is possible to investigate heterogeneity: the extent to which there may be different groups with different perceptions. Central research question addressed here is how the users' categorization of the collection may be derived from library loan transaction data.

3.2 Method

A regional library service organization in The Netherlands that has been collecting transaction data at five public libraries in their region as part of an ongoing project into collection management has agreed to the use of these data for research purposes. Like most libraries in this country, all five are based in small to medium sized cities. Main fields in the data set are a customer number; a title number and full title details; date and time of borrowing; and age and gender of the borrower. Note that, although in some countries legislation or library policies may pose severe restrictions on the libraries' use of personal data, the method does not require variables such as name and address. A client number, here encrypted to avoid the possibility of being traced to personal data, suffices to know which titles have been borrowed by the same user. Thus, legal or ethical issues are avoided. This allows easy replication of this method in other jurisdictions.

Within the available transaction data, the focus is on fiction titles instead of non-fiction titles, as the former are more prone to personal taste. The reliance on personal taste suggests that preferences and hence user categorization are more heterogeneous and capricious. The results of Saarti (2002), although for indexing rather than categorization, are an example of the heterogeneity in how fiction is perceived. If an analysis of fiction titles reveals a clear structure, this would likely to be found also for non-fiction. Also, only transactions recording fiction books aimed at adults were selected, because children's fiction is substantially different in subject and narrative structure. Inclusion of children's literature requires us to accommodate developments in reading skills and appreciation. For similar reasons, fiction in other languages than Dutch was excluded. Nearly all titles in the dataset by foreign authors concern translations into Dutch. However, most libraries also hold a small number of titles in their original language, predominantly English, French, and German. Here, too, accommodating reading skills would be required. Such titles were therefore excluded and only titles translated into Dutch were retained.

The data pertain to 22,426 fiction titles in total, but for reasons of stability of the resulting solutions and to avoid an excessive number of zero's, the top 500 titles were selected for analysis. The transaction data were transformed into a data matrix, $X = (x_{ij})$, with $i = 1,..., I$ rows representing borrowers and $j = 1,..., J$ columns representing book titles. The dataset has I = 13,142 and J = 500, and $x_{ij} = n$ for the number of times subject i borrowed title j in the time window considered.

When confronted with a very large number of choice alternatives, users tend to follow hierarchical elimination heuristics rather than compensatory processes (Tversky 1972; Tversky and Sattath 1979), as these are eminently more efficient. Tversky (1972) and Tversky and Sattath (1979) demonstrate that an elegant theoretical connection exists between such elimination processes and hierarchical tree representations. They show that trees provide a representation of a common feature selection process, where each node represents a particular discrete feature used in the elimination process. To represent the users' perception of the collection in terms of categories of similar titles, a hierarchical cluster analysis or ultrametric trees (Corter 1996) are used here, derived from the choice pattern of users. It is assumed that the likelihood that titles are combined over the given period reflects common features these titles share in the perception of the users.

One of the strengths of public libraries is that they attract people from different backgrounds and interests. Both in the United States and Europe, over 60% of the population visits a public library at least once a year (Collins and Chandler 1997; Eurobarometer 2002; National Endowment for the Arts 1998). As public libraries have such a broad appeal, its users are likely to differ in how they view the collection and what categories they perceive. Therefore, a latent class analysis is used to investigate whether there are segments of borrowers who differ in their categorization of the collection, as shown in different ultrametric trees.

The use of library loan data to investigate how users categorize titles and whether they are heterogeneous in this respect poses two methodological problems. The first issue is how to analyze the large number of book titles without using a priori aggregations that may influence results. Conceptually, this approach is similar to Wedel and DeSarbo (1998), who formulate a finite mixture of ultrametric trees. Their approach is appealing since it derives homogeneous groups of consumers that differ in the structure of their decision heuristic, based on a common features model. However, their method is developed for normally distributed paired comparison data, and is estimated on small samples, and is ineffective for the analysis of large choice-based datasets. Grover and Srinivasan (1987) propose the use of latent class analysis to simultaneously determine segments and (overlapping) clusters of items. However, the large number of book titles and the time consuming procedures for estimating latent classes restrict the possible number of indicator variables used in their latent class model. Aggregating books a priori by author or publishing house does not present a solution, since it increases the risk of

ignoring important variation in the data, and deriving the structure based on such an *a priori* grouping.

A second issue is the premise that combined choices reflect similar needs. The hierarchical cluster analysis groups titles based on how often they have been borrowed by the same user within a particular period. It is assumed that those combinations reflect similar needs. However, users may also choose other products for reasons of variety seeking. This would particularly be true for fiction as opposed to non-fiction. For instance, consumers returning a borrowed thriller may borrow another thriller to satisfy the same need, or a romantic novel to satisfy a different need. As no *a priori* product categorization is used, such as genres, and therefore no *a priori* assertion of what choices reflect similar needs and what choices reflect variety seeking, the question is how to distinguish between the two different kinds of choices.

Both issues are addressed by adopting the premise that variety seeking can be defined by comparing individual choices to their likelihood. Let $B_{a,\ldots,n}$ be the collection of library books. The likelihood of an individual borrowing both B_a and B_b is based on comparing all instances where B_a and B_b were combined versus all instances where B_a and B_b were not combined. If the likelihood of combining B_a with B_b is large, combinations of B_a with B_b at individual level will be seen as attempts to satisfy the same need. If the likelihood of combining B_a with B_b is low, individual combinations of B_a with B_b will be seen as reflecting variety seeking. By using a cut-off point in the joint likelihood, there are n categories of products satisfying relatively similar needs. These consumer based categories then allow for simultaneously determining segments and (overlapping) clusters of products, whereby variety seeking (i.e., choices across the user based categories) is taken into account.

A three-stage implementation is proposed that can be easily put into practice;

1. First, book titles are grouped based on borrowing incidence, by applying a hierarchical grouping method at an aggregate level, where ϕ serves as the distance measure. This is a common distance measure defined for count data that normalizes the X^2 distance between the titles by the square root of the combined frequency. This normalization is necessary as book titles vary greatly in their popularity. The Rand Index (Everitt 1993) is calculated to test the similarity of a 50/50 split-run, as a measure of the stability of the solution.
2. Next, the results of the first stage are used to summarize the titles into a limited number of consumer-based categories. The data matrix X is mapped unto this limited set of categories, resulting in a data matrix Y, y_{ik}, with $y_{ik} = n$ for the number of times subject i borrowed a title in category k, and $y_{ik} = 0$ otherwise. A latent class analysis of the variables indicating the derived categories, Y, is carried out to model heterogeneity among the borrowers and identify unobserved segments (Grover and Srinivasan 1987; Wedel and Kamakura 2000). The grouping into categories in stage 1

mitigates the influence of minor titles on the latent class solution. The PANMARK (Van der Pol, Langeheine, and De Jong 1991) program is used for that purpose. Graphs of AIC and BIC against the number of classes are used to identify the appropriate number of segments.

3. Finally, for each of the latent classes new ultrametric trees are estimated to the data of the individual book titles to investigate the common feature structure for the individual classes (Corter 1996; Everitt and Rabe-Hesketh 1997). A crisp assignment of customers to each of the latent segments is used in step 3, based on the posterior probabilities of membership, which presents the optimal Bayesian classification of subjects based on the latent class results. Then, for each of these segments the hierarchical grouping based on ϕ is applied, and the Rand Index is used to establish the stability of the solution.

This procedure provides us with ultrametric trees for a number of segments, representing a hierarchical categorization of the collection. The ultrametric trees reflect the common features structure assumed to underlie the consumers' choice process. The similarity measure and classification procedures used accommodate the discrete nature of the transaction data, but the procedure used is a heuristic one, where necessarily different criteria are optimized in each of the steps. Therefore, bootstrap and Rand Index based procedures were applied to investigate the stability of the resulting solution.

In addition to an examination by the authors, all results were presented to an expert panel for interpretation. This panel consisted of ten book reviewers from a national library service agency, four librarians from two regional library service centers, one library researcher from one of the regional library service centers, a professor from a University Literature Department and a High School Literature teacher.

3.3 Results

3.3.1. Stage 1

Ultrametric trees as well as the Rand Index on the split-runs were generated for each of the five libraries separately and for the combined dataset. The ultrametric trees for each of the five libraries were very similar. In addition, the Rand Index for each of the split-runs was over 0.90 on average. All ultrametric trees show seven main categories: four product categories (Dutch romantic fiction; translated romantic fiction; detectives/thrillers; and literary/popular) and three author categories (William Sarabande; Virginia Andrews; and Baantjer – a Dutch detective writer whose books have recently been televised). The individual titles under these seven main nodes were very homogeneous (i.e. a Sarabande title was never categorized under Andrews or Baantjer, or visa versa). Within translated romantic fiction, relevant sub clusters can be distinguished based on historic versus contemporary settings and on explicitness of detail. The thrillers and detectives cluster contains interpretable sub clusters of nationality (particularly English versus American

authors) and amount of action. At the lowest level of all four product categories, titles are grouped together by author. Compared to the seven main categories, however, these sub clusters of titles are far less prominent.

Although the results for the individual libraries were essentially the same, their shelving system and lay out is different. Three of the five libraries have organized all their fiction in alphabetical order by author, allowing for any categorization to emerge. Two of the five have a genre based shelving, but different from each other. The results are therefore not at all likely to be attributable to the way libraries present their products. Thus, the categorization emerging from the analysis is likely to reflect basic consumer needs in library fiction.

One group of well-known popular writers (e.g., Maeve Binchy, Sidney Sheldon, Catherine Cookson, and Jackie Collins) switches in various split-runs between literary/popular and translated romantic fiction. These books are read both in combinations with other romantic fiction as well as with novels that are of a more literary nature, so the results may imply that they are ambiguous in the needs they fulfill.

3.3.2. Stage 2

The top 500 titles from the ultrametric tree were recoded into the identified seven categories. Because of the instability of the group of authors that switch categories among split runs, these were coded as a separate eighth category. A latent class analysis was then performed on the dummy variables for each of the eight categories to derive market segments. The graph of the AIC and BIC against the number of classes pointed to a four class solution.

The four latent classes are roughly equal in size; two are approximately 20% and two are around 30% of the sample. The first segment of borrowers scores high on variety seeking; this segment has high probabilities of borrowing in almost all categories. In contrast, the second segment confines choices to more literary novels only and scores low on suspense or romance titles. The third segment is interested in detectives and thrillers with an occasional literary novel, where as the fourth specializes in romance, both original Dutch and translated romantic fiction.

3.3.3. Stage 3

Ultrametric trees, based on the coefficient ϕ were estimated for each of the latent classes. Estimation of the trees was limited to the top 250 titles in each class, as the number of transactions within each latent class is considerably smaller than in the first phase, and very small numbers that result in instability of the tree solution are to be avoided. Figures 3.1, 3.2, 3.3 and 3.4 show the trees for each of the four classes. To maintain clarity of the figures, the lowest level of the 250 individual (Dutch) titles is not shown here, but rather the lowest group levels.

Figure 3.1 Ultrametric tree for segment 1

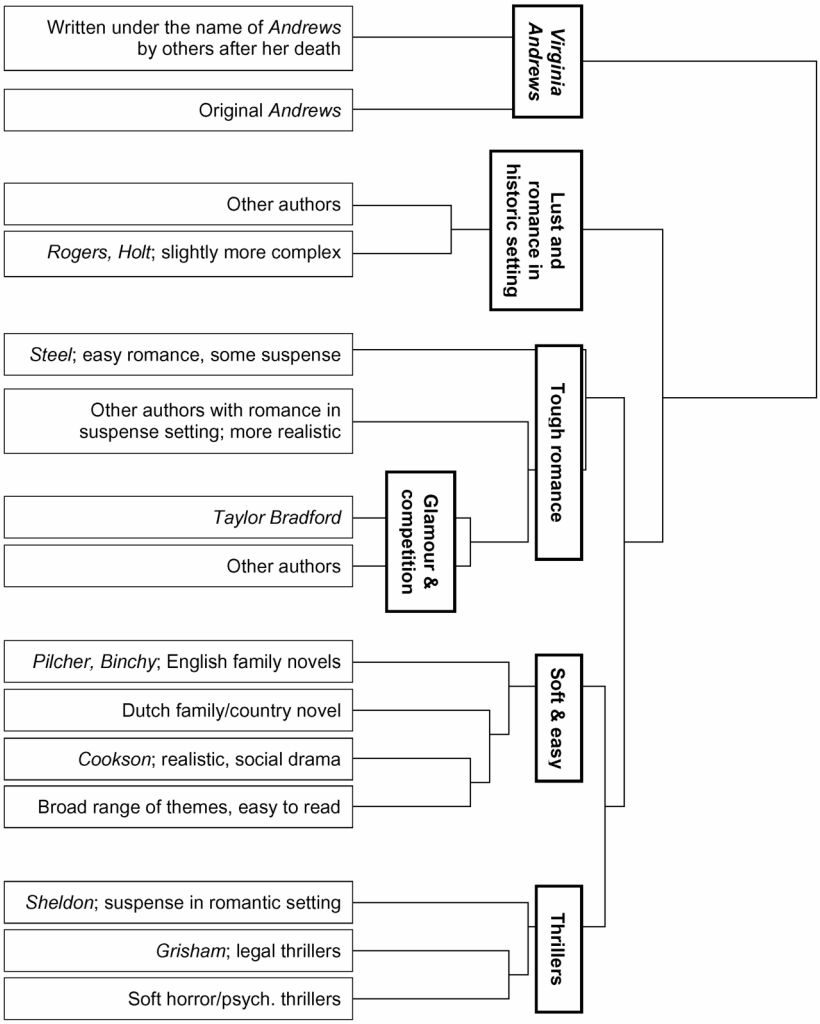
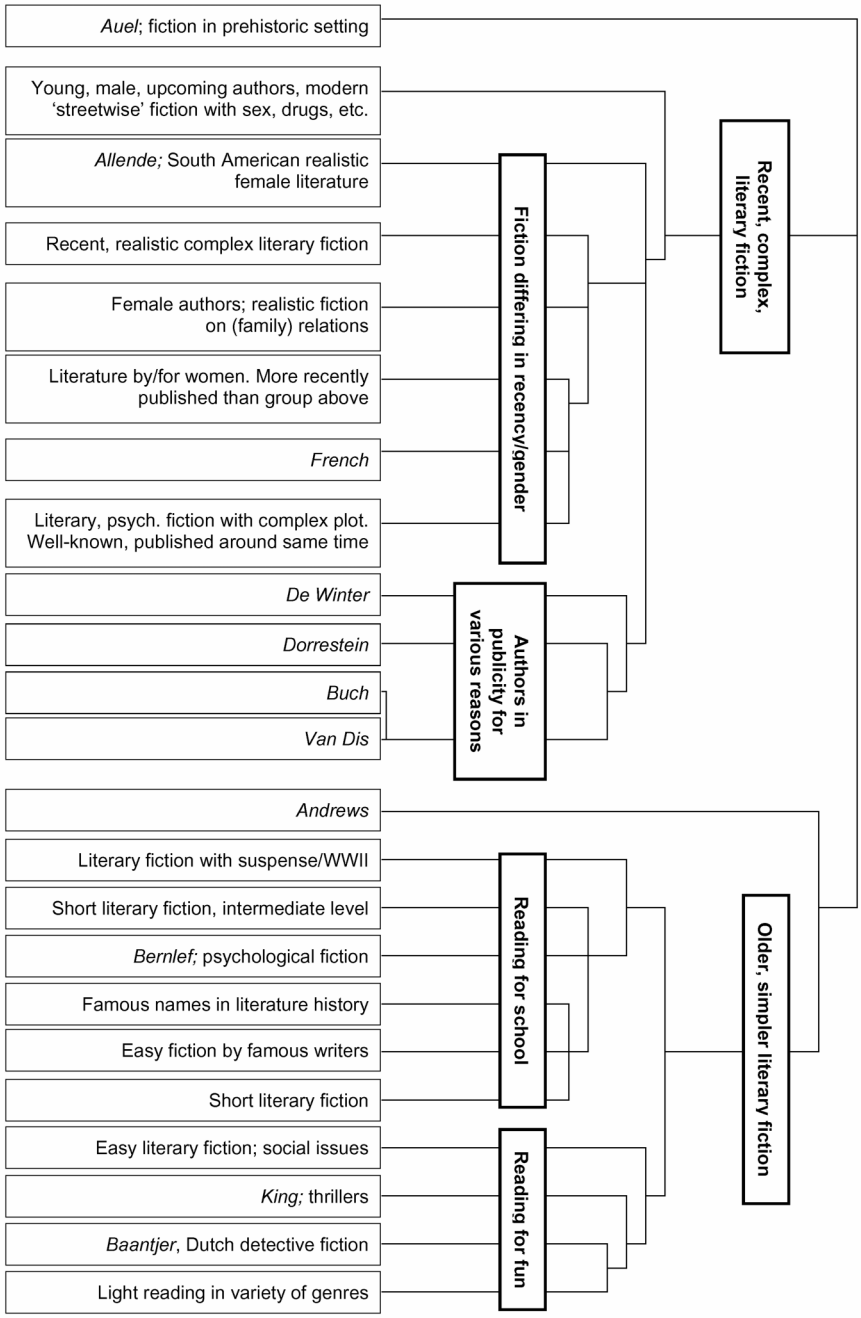


Figure 3.2 Ultrametric tree for segment 2



Although the latent class analysis indicates that the first segment chooses from all categories, the tree in figure 3.1 reveals that the top 250 titles read by this segment consist mainly of American romantic fiction translated into Dutch. Apart from Virginia Andrews as a separate category, the tree shows categories such as ‘lust and romance’, romance with explicit detail, often referred to as ‘bodice rippers’; ‘tough romance’, with less explicit detail, but where dark family secrets or business rivalry hinders passionate love; ‘soft and easy’, no suspense, glamour or explicit detail, but down to earth; and ‘(feminine) thrillers’. Apart from groups of distinctive authors, the ‘tough romance’ category has a specific sub category of ‘glamour and competition’. ‘Pulp fiction’ is commonly used as a generic term for such romantic products, and often implying that all romantic titles are ‘more of the same’. This group of heavy users of romantic fiction, on the other hand, distinguish specific sub genres in their choice behavior that seem to differ in their setting (historic, business) and level of romance (lust, passion, love).

The second segment (figure 3.2), scoring high on literary fiction, shows a clear distinction between recent, complex literature and the simpler, shorter literary classics. The latter category of classics is typical for final year High School reading lists. The category of recent and complex literature seems heavily influenced by the question of “what’s new and what’s hot”; innovation and publicity are the prime underlying criteria for the sub categories. Apparently, a literary fiction collection should be divided into a classical section and a ‘just published’ section if it is to match user needs. In addition, the results suggest that sub categories of varying degrees of complexity would aid the reader of classics in literary fiction.

The third segment (figure 3.3) clusters suspense in ‘detectives’ and ‘thrillers’. Within ‘detectives’, the titles by Dick Francis and Baantjer each have a distinct setting and are viewed as a separate sub category. There are also specific sub genres within the genre of detectives. The thriller category shows clear sub clusters of action thrillers and medical thrillers. The remainder of the titles is split between thrillers with a more masculine character and those with a more feminine character. The latter has legal thrillers as a particular sub category. Similar to the first segment, setting apparently is an important feature in clustering the collection. Examples here are England versus the United States or the professional settings of horse racing, court room and hospitals that are used by borrowers to cluster the collection.

Figure 3.3 Ultrametric tree for segment 3

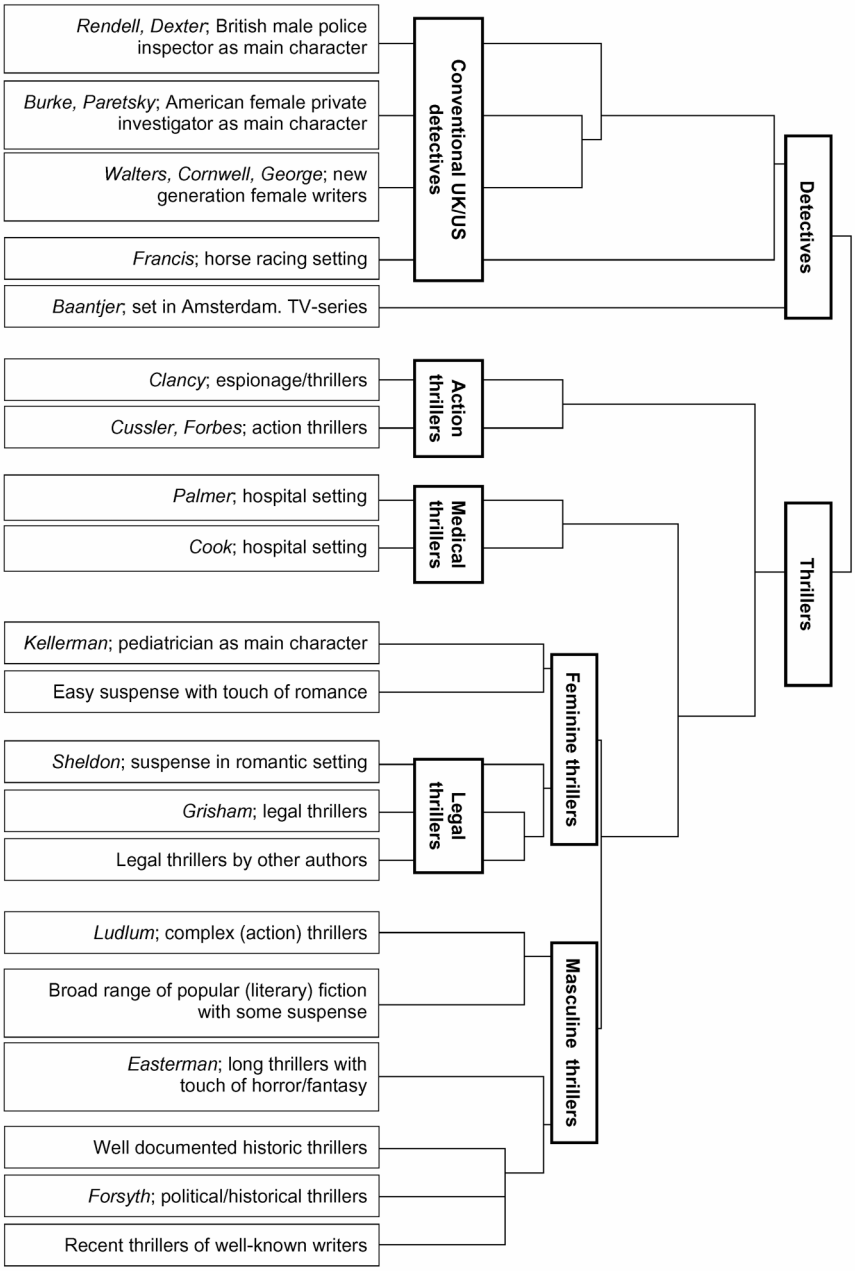
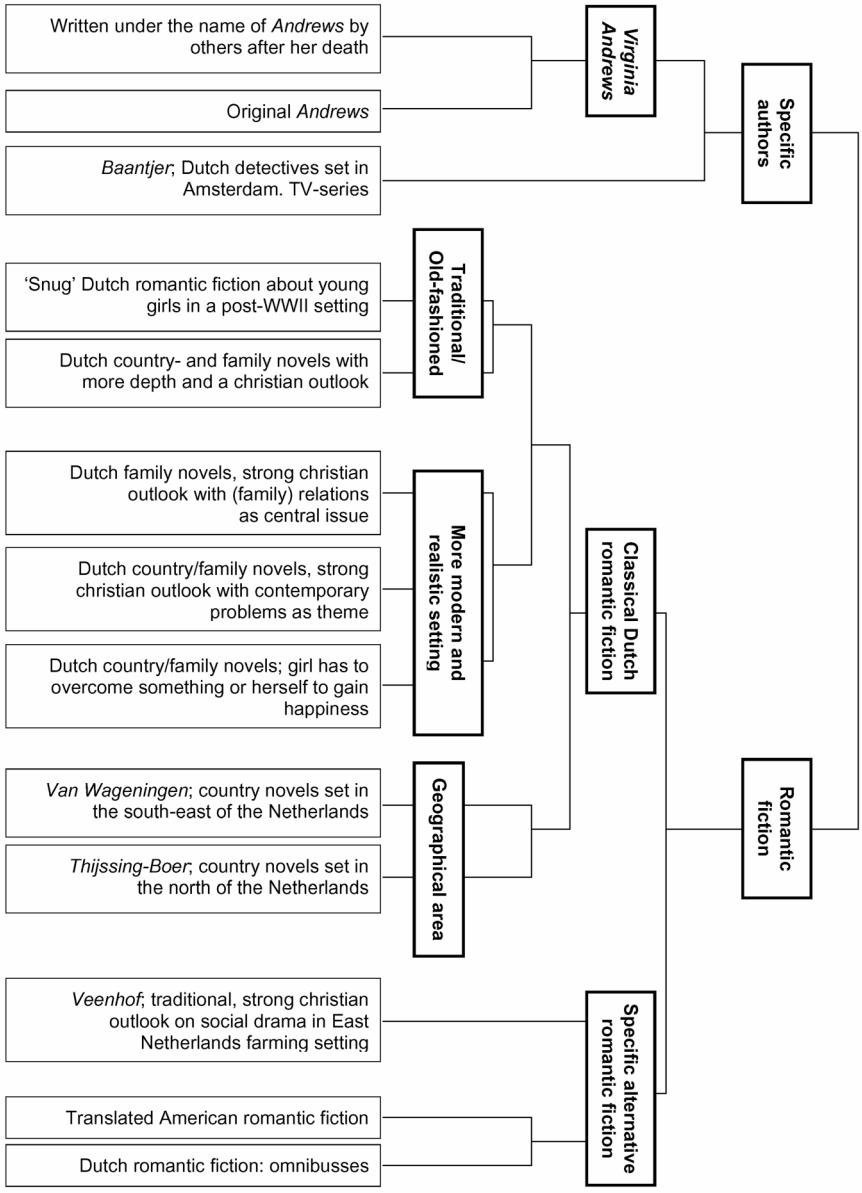


Figure 3.4 Ultrametric tree for segment 4



The fourth segment (figure 3.4) scores high on Dutch romantic fiction. The tree shows subcategories of titles with a more old-fashioned setting and traditional values; a more modern and realistic setting with covert mention of societal problems such as divorce, drugs or illnesses; and a subcategory where authors, in all of their titles, concentrate on one geographical area. Furthermore, the tree shows three categories closely related to Dutch romantic fiction and titles of Virginia Andrews and Baantjer as more separate alternatives. Here, only the clusters of geographical areas point to setting as important within this genre. For the other sub clusters, a dimension such as escapism versus realism seems to be an important underlying construct. Here, users seem keen to know how explicitly the titles confront the reader with societal problems.

3.4 Discussion

The results show a categorization of fiction that is not captured entirely by standard public library fiction categories such as romance, suspense and drama. Instead, users seem to look for additional attributes in choosing titles. Most notable in the results is the sharp distinction between romantic fiction by American authors and by Dutch authors, while both appeal to the same need for romance. As all titles are in Dutch, the works by foreign authors being translations, language does not explain that sharp distinction. Closer inspection of the books in these categories indicates, however, that they show salient and systematic differences in the setting of the plots as well as the sets of values portrayed in the characters. Whereas American romantic fiction is worldlier in its setting and more explicit in its detail, traditional Dutch romantic fiction generally has a farming or middle class setting and religion rather than passion as the driving force behind the plot; a difference that is often adequately captured in the style of the book cover images. Although romance and suspense are universal needs, compassion with particular settings, lifestyles or values seem important intermediating variables in determining which product is selected to satisfy those needs. Values in particular, are relatively distal, but nevertheless powerful determinants of consumer behavior. This apparent importance of setting and values is corroborated by other elements of the results. Other examples of clusters that point to setting as an important attribute are Francis' detectives situated in the world of horse racing; medical thrillers such as by Palmer and Cook; court room thrillers by Grisham and others, all in segment three; the Dutch romantic fiction titles that are set in particular geographical areas in segment four. The importance of life style settings and values suggested by the research is supported by findings from psychology, on topics related to imagery, such as day dreaming. Imagery and fantasies are drawn from real experiences, with the historic material rearranged in a particular configuration (Singer 1966). The enjoyment of consuming (library) fiction is based on enjoying a fantasy. Enjoyment is therefore likely to be influenced by the reader's ability to imagine the story and thus the ability to draw from personal past experiences to construct the imagery.

Variables such as complexity or realism seem interesting constructs for dividing genres into sub genres.

The research question was how the users' categorization of public library collections may be derived from library loan transaction data. It was shown how ultrametric trees in combination with latent class analysis may be used to derive segments and their specific categorizations. Although preference for fiction is prone to personal taste and likely to be heterogeneous and capricious, the results show a clear categorization of book titles, and suggests particular product attributes to play a role in choice.

The rationale for the research question was that public library collections are more accessible when the way their collection is organized matches these users' perceptions. Implementation of a categorization based on these results should aid the public in finding the right titles and help collection managers in determining the needs of the users. In the past few years, several libraries have switched to a thematic presentation of their fiction and have reported a subsequent increase in borrowing[6]. This suggests that adjusting the shelving to user perceptions of the collections aids users in addressing their needs. However, formal research is necessary to more precisely determine the size of its impact.

In sum, it can be concluded that transaction data are a valuable source of information about user choice behavior. One interesting avenue for further research is to tie in the results with recommendation systems. As remarked by Saarti (2002), subjective aspects have also been noted to be important in fiction recommendation systems, such as found on the internet. Saarti (2002) calls for the application of special tools, such as thesauri and dictionaries, to achieve some consistency. Perhaps that, in addition to such special tools, results of studies like this one may help in using the right aspects in describing and recommending fiction titles. Also, such approaches as presented here may be improved upon when satisfaction data can be added. Note that presently, we only know that customers have borrowed (tried) a particular title; not how much they liked the title. If distances between titles could be based on satisfaction among the same customers rather than similar choice, recommendations could be corrected for erroneous, regretted choices.

Deriving the users' categorization of fiction titles is only one application of library transaction data. An obvious avenue for further research would be to see how users categorize non-fiction or children's literature. Also, transaction data may be used as time series data. For instance, by monitoring children's reading careers, one may gain insight into which reading behavior leads to early drop-out and which leads to continued library use as adults. Knowledge of such reading patterns and outcome will aid in recognizing deficiencies in reading skills and allow for early intervention. As such, analysis of transaction data may not only suggest improvements in 'marketing the collection', but also help public libraries in their traditionally important role in stimulating literacy and the cultural education of the people.

[6] As reported by the Association of (Dutch) Public Libraries and Provinciale Bibliotheek Centrale Noord-Brabant in personal communications.

4. Market Structure in the Performing Arts: *Individual Differences in Sensory Modality Dominance and Product Choice*

Arts marketers are pressed to continuously solicit customers for a stream of new, unknown products with fixed deadlines. Many arts marketers use cross-selling, such as direct mail bundling of performances into subscription packages. For both forms knowledge of choice patterns is particularly important. With new products to be marketed for almost every evening, marketers must avoid customers to be inundated with direct mail. Thus, they can only approach a small selection of customers every time. With subscription packages, consumers will reject entire packages if they only like a few of the included performances; bundling would thus hinder rather than improve sales. We review recent developments in neurophysiology that indicate that some people are more auditory and others are more visually oriented and argue that these individual differences might influence variety seeking in the performing arts as some performances are more auditory and others more visually stimulating. Results show that choice patterns in the performing arts do seem to be influenced by an auditory-visual dimension. Together with complexity, this dimension is also shown to have predictive validity over and above repeat purchases in predicting future choices.[7]

4.1 Introduction

Although all living creatures have five senses, one sense is usually dominant and better developed than other senses. Species differ in which sensory modality is dominant, often depending on the particular requirements of the habitat. For example, homing pigeons and birds of prey have a strong visual ability (e.g., Fernandez-Juricic, Erichsen, and Kacelnik 2004); for many rodents, olfaction is the dominant sensory modality (e.g., Mouly et al. 2001); and bats, whales and dolphins have superior auditory skills (e.g., Moss and Sinha 2003).

The visual sense has long been regarded as the most important modality for humans, dominating other senses in perception (cf. Welch 1999; Welch and Warren 1980). Recent findings in neurophysiology, however, suggest that human sensory modality dominance ranges from highly visual to highly auditory (Fort et al. 2002; Giard and Peronnet 1999). This is parallel to current developments in other fields, such as

[7] This chapter is based on Boter, Paas, Inman and Wedel, "Individual Differences in Sensory Modality Dominance and Product Choice" (working paper). We are very grateful to the AUB for providing the data and to the four experts for help in rating.

research into auditory versus visual dyslexia (cf. McAnally, Castles, and Stuart 2000) or the possession of absolute pitch in music (e.g., Drayna et al. 2001).

As our review of these developments will illustrate, the phenomenon of individual differences in sensory modality dominance is a novel finding. While it has been proven to exist in small-scale laboratory settings, its antecedents and effect on higher order mental processes are still unclear. Notwithstanding these early stages, it has potentially important implications for consumer behavior. First, it may influence information acquisition. For instance, some consumers would be more susceptible to radio commercials and others to print advertisements. In processing television commercials, some consumers would focus on the voice over and sounds, others on images and visual effects. Second, it may direct choice behavior for hedonic products, where sensory stimulation is a primary motivation for consumption (Hirschman and Holbrook 1982). The level of enjoyment derived from hedonic products depends on abilities such as sensory skills. Only when skills are challenged beyond a particular threshold and are able to address those challenges, do consumers reach an optimal experience of enjoyment, referred to as 'flow' (Csikszentmihalyi 1991; Joy and Sherry Jr. 2003; Mathwick and Rigdon 2004). This implies that consumers derive more enjoyment from products that match their dominant sensory modality. For instance, in home entertainment electronics, consumers with better auditory skills would derive more pleasure from and therefore invest more in music equipment and CD's, while consumers with better visual skills would invest more in high quality television and DVD's. And here, in choosing an event for an evening out, some consumers would choose to listen to music over watching a dance performance or vice versa.

The purpose of this research is to assess the relevance of sensory modality dominance to consumer behavior. Here, we focus on its potential effect on choice behavior by investigating whether individual differences in sensory modality dominance are reflected in the decisions consumers make. Specifically, our focal research question is whether people exhibit choice behavior that is consistent with this phenomenon when faced with the task to choose from a variety of entertainment products that differ in the sense that is primarily addressed. We study transactions on a large sample of consumers, enabling detailed assessment of heterogeneity. This also allows us to investigate whether the construct is driving actual behavior, its effects rising above the clutter of possible confounds.

The remainder of this chapter is structured as follows. First, we discuss sensory modality dominance and review the evidence for individual differences in sensory modality dominance. Second, we introduce the Amsterdam Central Box Office (The Netherlands) and their transaction data of over 300,000 tickets sold in different subscription packages over a three-year period. As validated by expert ratings, performances in the data set range from highly auditory (e.g., chamber music) to highly visual (e.g., modern dance). We derive scales from the combinations of genres chosen by

consumers using an unfolding model. These scales reveal an auditory–visual dimension in consumer choice behavior. Convergence between the scales and expert ratings confirm this interpretation. Also, we show that the auditory-visual scale has predictive validity. We conclude with a discussion of implications and possible avenues for further research.

4.2 Sensory modality dominance

4.2.1. Sensory modality dominance in humans

Humans have long been considered visually dominant, because the visual modality has consistently been found to dominate overall perception in a number of tasks (Welch and Warren 1980; Welch 1999). Classical examples are the so-called McGurk effect (McGurk and MacDonald 1976) and ventriloquist effect (Jack and Thurlow 1973; Thurlow and Jack 1973; Witkin, Wapner, and Leventhal 1952). The McGurk effect occurs when a movie of a talking head with particular lip movements is dubbed with different sounds. People often report hearing the sound they *saw* rather than the sound they heard (McGurk and MacDonald 1976). The ventriloquist effect refers to the perception of sound as coming from a direction other than the true direction, due to the influence of visual stimuli (Thurlow and Jack 1973). For instance, when persons observe a telephone in front of them but hear a ringing sound from a different direction, they will report the sound emanating from the telephone. This displacement effect is stronger when the distracting visual stimulus is better associated with the sound (Thurlow and Jack 1973) and when synchronization between a (moving) visual stimulus (e.g. lips) and sound is more accurate (Jack and Thurlow 1973).

Interestingly, humans begin life with an auditory modality dominance (Lewkowicz 1988a; Lewkowicz 1988b; Lewkowicz 1994; Robinson and Sloutsky 2004; Sloutsky and Napolitano 2003). The most evident explanation is that auditory skills already develop in utero, whereas visual skills cannot develop until after birth (e.g., Lewkowicz 1988a). Alternative explanations are the need for auditory dominance as prerequisite to language acquisition or the lower level of attention needed for processing auditory stimuli (Sloutsky and Napolitano 2003). Sloutsky and Napolitano (2003) and Robinson and Sloutsky (2004) suggest auditory sensory dominance may continue well into the preschool years. This would explain why previous consumer behavior research into sensory modality dominance (Macklin 1994) did not find any sensory dominance in young children. Those participants may have been at an age when sensory dominance is shifting from auditory to visual dominance.

4.2.2. Individual differences in sensory modality dominance

Sensory modality dominance and its development from auditory to visual dominance are well-established phenomena in neuropsychology and neurophysiology. Research into individual differences, however, has been scant. These differences have mostly been speculative. For instance, in space and aviation research, differences in sensory modality

dominance have been suggested to account for differences in astronauts' susceptibility to space motion sickness (e.g., Kohl 1987). Motion sickness is thought to occur when visual input conflicts with somatosensory input. A stronger reliance on visual input may lead to more difficulty in coping with discordant somatosensory input. More popular examples of early hypotheses concerning individual differences in sensory modality dominance are the learning theories of Neuro-Linguistic Programming or NLP (Bandler and Grinder 1979) and the Theory of Multiple Intelligences (Gardner 1983). NLP states that people differ in which modality is preferred. The dominant modality is presumed to be evident in the kind of metaphors used by the person in communicating (e.g., "That sounds right to me" versus "That looks right to me") or patterns in eye movements. These theories argue that addressing people in their dominant modality helps in establishing rapport and enhances communication and learning (Bandler and Grinder 1979). The Theory of Multiple Intelligences proposes seven different intelligences, including an "auditory/music intelligence" and a "visual/spatial intelligence". Like NLP, people are thought to have a dominant type of intelligence (Gardner 1983).

Recently, corroborating evidence has emerged in neurophysiology for an auditory versus visual dominance. In a series of laboratory experiments using EEG recording in the same bimodal perception tasks (i.e., detecting a change in the shape of a circle on a computer screen or in the pitch of an accompanying sound), some people were found to react quicker to the change in the visual stimulus and others to change in the auditory stimulus (Fort, Delpuech, Pemier, and Giard 2002; Giard and Peronnet 1999). This dominance of either sense is a gradual difference, with people ranging from highly auditory to highly visual (Fort, Delpuech, Pemier, and Giard 2002). Splitting the samples in two groups on the basis of the sensory modality with the shortest reaction time, brain scans showed significantly different event-related potential (ERP) results for the two groups in processing redundant (Giard and Peronnet 1999) and non-redundant (Fort, Delpuech, Pemier, and Giard 2002) multi-sensory cues in the brain. In both redundant and non-redundant situations, adding an auditory cue does not enhance the level of neural activity in the visual cortex for visually dominant persons, but adding a visual cue increases activity in the auditory cortex. The opposite is true for auditory dominant persons, for whom auditory cues increase activity in the visual cortex, but for whom visual cues have no effect on the level of neural activity in the auditory cortex (Fort, Delpuech, Pemier, and Giard 2002; Giard and Peronnet 1999).

The determinants of individual differences in sensory modality dominance are unclear. Although the research of Giard and Peronnet (1999) and Fort et al. (2002) provides physiological evidence for individual differences in sensory modality dominance, this does not necessarily imply these differences are innate. There is substantial evidence that over a long period, parts of the brain may develop to take on different functions. This process of neural reorganization is referred to as (neuro)plasticity (Shaw and McEachern 2001). Given that infants begin life as auditory dominant and

develop into visually dominant adults, obstacles in the development process may leave some humans “underdeveloped” and consequently leave them stronger in processing auditory input than in processing visual input. Similarly, an obstacle in auditory development might contribute to people becoming stronger in processing visual input than in processing auditory input. Support for the idea of sensory specific obstacles in development can be found in dyslexia research. Researchers have found different sub types of dyslexia, such as phonological (i.e. spoken) and surface or orthographic (i.e. written) dyslectics (see McAnally, Castles, and Stuart 2000 for a discussion). Research in reading skills found that visual sensitivity explains independent variance in orthographic skill, but not phonological ability. Contrarily, auditory sensitivity explains phonological skill but not orthographic skill (Talcott et al. 2000). Taken together, this suggests that there are “auditory dyslectics” and “visual dyslectics” to various degrees.

Rather than obstacles in the development process, individual differences in sensory modality dominance may also result from positive influences, such as prolonged sensory specific training. Particularly for musical abilities, physiological research shows training can lead to neuroplastic changes (e.g., Pantev and Lutkenhoner 2000; Schulz, Ross, and Pantev 2003). Also, Giard and Peronnet (1999) make the informal observation that several of the more auditory dominant individuals had some form of elementary music education. On the other hand, research on the possession of absolute pitch indicates that certain auditory or musical abilities are at least in part, genetic and hereditary (e.g., Baharloo et al. 2000; Drayna, Manichaikul, de Lange, Snieder, and Spector 2001). Absolute pitch is the ability to identify the pitch of tones in the absence of a reference pitch and is physiologically associated with an increased leftward planum temporale, believed to develop in utero (e.g., Keenan et al. 2001).

In sum, although its antecedents are subject of continuing research, there is emerging evidence that human sensory dominance ranges from highly auditory to highly visual. The question addressed here is whether these differences are reflected in choice behavior for hedonic products, where sensory stimulation is a primary motivation for consumption (Hirschman and Holbrook 1982). Abilities, including sensory skills, are regarded to be important antecedents for enjoyment. To reach an optimal experience of enjoyment, referred to as ‘flow’, skills should be in balance with challenges (Csikszentmihalyi 1991). Challenges exceeding skills result in anxiety, whereas skills exceeding challenges result in boredom. When challenges and skills are in balance, but below a particular threshold, the consumer will revert to apathy (Csikszentmihalyi and Csikszentmihalyi 1988). The latter does not imply that enjoyment or flow occurs only in relatively complex situations. Skills also enable a person to see and enjoy the richness in ‘even the most mundane sights’ (Csikszentmihalyi 1991, 107). This suggests that consumers are likely to quicker or more profoundly experience a hedonic response from sensory products that address their dominant modality. Thus, it seems likely that

differences in sensory skills may lead to differences in preferred type of entertainment and hence influence consumer choice.

4.2.3. Roadmap to the empirical investigation

Our core thesis is that an influence of sensory modality dominance would be revealed by consumers predominantly choosing product combinations that are in line with a particular sensory dominance. Overall, the chosen combinations of products should reveal a scale of products ranging from highly auditory to highly visual. In order to show that sensory modality dominance influences actual consumer choice behavior, three criteria need to be satisfied.

First, we need a category of products that differ in both the extent to which the auditory or visual modality is addressed, as well as in other respects. We introduce the performing arts as a product category that addresses both the visual and auditory sense, but where other variables such as brand equity, motivations and deterrents have been found to play a large role. An extensive expert rating process of 744 subscription packages is used to empirically confirm that the products investigated here–performing arts genres–differ in the sensory modality addressed as well as on the variables that have been found important in this field.

Second, we need to show that the chosen combinations of products together form a scale. We present the transaction data for the 744 subscription packages, consisting of over 300,000 purchased tickets, and propose a methodology for deriving unfolding scales from the chosen combinations of products. We chose to employ a unidimensional unfolding model, as such models are highly suited for investigating unidimensional constructs that are bi-polar (Van Schuur and Kiers, 1994). Such models can be used to investigate whether combinations in which consumers attend performing art genres indeed reflects a scale reflecting consumer sensory modality dominance, as suggested above.

Third, we need to validate the derived scale as being auditory-visual. Using the expert ratings of the 744 subscription packages, we examine whether the derived scale is better explained by the sensory modality addressed or by the other variables that have so far been found important in performing arts choice behavior. To further assess its importance for choice behavior, we test whether sensory modality is significant in predicting choices for a new season, over and above repeat purchase. We discuss our approach in more detail in the next section.

4.3 Examining the influence on choice behavior

4.3.1. Choice behavior in the performing arts

The performing arts are a hedonic product category that addresses both the visual and auditory sense. For instance, in listening to music the auditory modality will be most important, for watching dance the visual modality will be more important, and both modalities will play a role for opera. Previous research has shown that patrons of one

genre commonly attend other genres as well (e.g., Andreasen and Belk 1980). As genres overlap and differ in various respects, combinations of genres are likely to follow particular patterns, depending on the patrons' choice criteria. If sensory modality dominance influences choice behavior, patrons should be particularly inclined to combine genres that provide optimal auditory-visual stimulation. In other words, highly visual genres should mostly be combined with moderately visual genres; moderately visual genres with mixed genres; mixed genres with moderately auditory genres; and moderately auditory genres with highly auditory genres. The combinations of genres attended by patrons should, thus, reveal a scale of genres ranging from highly auditory to highly visual.

In exploring an auditory–visual scale in choice behavior, we need to control for alternative explanations for choice patterns. A review of the marketing literature on the performing arts currently suggests three groups of attributes drive choice for performing arts: indicators of renown, motivation-related factors, and deterrent variables. We briefly discuss each in turn.

Indicators of renown. Rather than choosing the same performance every time, visitors are likely to look for new performances. In fact, the uniqueness of the experience is considered to be part of the enjoyment (Hirschman 1983). To minimize the accompanying uncertainty about a positive consumption outcome, consumers will probably rely on cues[8] such as the renown of the pieces that are performed (Garbarino and Johnson 1999; Putler and Lele 2003), renown of the authors of the pieces (Reddy, Swaminathan, and Motley 1998), renown of the performers of the pieces (Currim, Weinberg, and Wittink 1981; Reddy, Swaminathan, and Motley 1998), or renown of the venue of performances (Bhattacharya, Rao, and Glynn 1995; Garbarino and Johnson 1999). Each component may serve as a cue for the expected outcome of the experience and thus represents an important influence on choice behavior. Genres vary substantially in the role of the renown of the components. For instance, in stand-up comedy, it is common for performers to present new material every year. In opera, on the other hand, most pieces have been performed many times before. Compared to opera, the renown of the pieces or material in stand-up comedy is therefore lower. Also, genres differ in market structures: in chamber music it is easier to set up a series of performances, as only a few artists and a small space are required. For concerts or operas, much more investment is required. The role of such market entry barriers may lead to a few well-known performers and venues in one genre (e.g., opera) and many unknown performers and venues in another genre (e.g., chamber music).

[8] Critics' reviews can also be an important source for judging the quality of the consumption outcome (Eliashberg and Shugan 1997; Holbrook 1999). However, because in our dataset packages are sold in advance of the season, there are no critiques available to guide choice. Instead, consumers will have to focus on the renown of the service components.

Motivation variables. Choice behavior is likely to reflect specific benefits sought (Lefkoff-Hagius and Mason 1993). One well-known benefit of both high- and low-brow cultural goods is its 'beauty' or esthetic stimulation (e.g., Hirschman 1983; Holbrook and Hirschman 1982; Holbrook and Schindler 1994). Some types of performances such as comedy or musicals are more focused on delivering fun and enjoyment (Holbrook and Hirschman 1982). A third dimension on which performances may differ is the level of excitement (Holbrook and Hirschman 1982). For instance, for sensation seeking consumers (Zuckerman 1979), pop music may be more appropriate than chamber music. Finally, entertainment may also address consumers' need for stories and empathy (Escalas and Stern 2003). Where esthetics provide cognitive stimulation, story-based entertainment, such as drama or comedy, allows spectators to connect to referent others (e.g., Russell, Norman, and Heckler 2004) and aids in the construction of identity and values (e.g., Kozinets 2001).

Deterrent variables. Although the marketing literature has identified quite a number of factors influencing choice behavior of performing arts, 'hygienic' or deterrent factors have so far seldom been taken into account. Holbrook (1999) is the first to consider such variables in the context of movies: objectionability (violence, explicit sexual scenes), complexity[9] (intellectually demanding), and foreign (non-US movies containing more exotic elements and being less connected to everyday life). Although such characteristics may be considered motivational variables for some, these aspects are more likely to decrease rather than increase popular appeal. These variables are also relevant to the context of the performing arts. Staged performances, too, have been known to be controversial at times. Comedians sometimes use strong language or are known for their harsh humor. Theatre plays may be confronting in the (taboo) subjects they raise or use of graphic language. Also, being unconventional is an important paradigm for many authors and performers in the arts; both in a high brow, abstract sense as well as in low brow genres, such as stand-up comedy, where pointing out the conventions of people's every day life is often part of the author's message. Performances of other cultures, too, such as Indonesian Gamelan music or Chinese xiadiyana dance, may be considered unconventional for the majority of consumers. Finally, for many consumers, complexity is synonymous to the arts. Certainly for the more highbrow genres, cultural knowledge is often a sine qua non for enjoyment.

In sum, if sensory modality dominance influences consumer behavior, chosen combinations of genres should reveal a scale of genres ranging from highly auditory to highly visual, over and above the differences of genres in the renown of the various components, in the motivations the performances address, and in the deterrent aspects of the performances.

[9] Note that, while some research has found complexity to play a role in this area, it has rarely been explicitly considered as a deterring aspect, limiting popular appeal.

4.4 Transaction data

The Amsterdam Central Box Office (AUB), a collective marketing initiative for all performing art venues in this city, supplied us with sales data of their subscription packages. Many theaters and concert halls in Amsterdam have one or more subscription packages that can be purchased directly at the venue. For most of these packages, a quota is reserved for the AUB to sell through their annual catalogue, often at a lower price. Each year, this catalogue offers over 300 packages on average, comprising more than 1,200 different events. In total, over fifty venues participate in the catalogue and the packages represent a broad spectrum of performing arts genres. Apart from more high-brow forms of classical concerts, chamber music, opera and ballet, the catalogue also offers the avant-garde in dance, music and drama, as well as more accessible art forms like jazz, pop, and rock music, shows, musicals and stand-up comedy. The organization supplied us with the transaction data of three seasons, covering 1993/1994 to 1995/1996. The data set contains performance details such as performance title, location, and genre codes based on an index of ten main genres. Customers are assigned a customer-id, allowing us to link choices to individuals and to track choices across seasons. Additional customer details are limited to age, gender and zip code.

We removed packages specifically aimed at children or packages that were added later in the season and not described in the annual brochure. Furthermore, we only selected customers that participated in all three seasons. The resulting dataset consists of 12,836 customers, who over the three seasons made a choice from 744 different packages. In total, these customers bought 70,184 packages representing 303,413 individual tickets, amounting to an average of 1.8 packages and 7.9 tickets per person per season. Over the three seasons, most customers visit more than one genre, with an average of 3.6 genres out of the available ten main genres. The limited customer characteristics registered in the dataset show that women are in the majority (62.1% female), as is typical for arts consumption (Gainer 1993). Average customer age is 50.3 years.

To evaluate predictive validity, the AUB agreed to also provide transaction data for a fourth season (1996/1997). Similar rules for the exclusion of packages were used. Out of the 12,836 customers in the three-season dataset, 9,562 customers continued to order subscription packages in the fourth season. Sales totaled 18,513 packages representing 74,115 tickets, and amounting to an average of 7.8 tickets per person, similar to the previous seasons. Demographics, too, remained relatively unchanged.

4.4.1. Expert ratings

To explain the choice patterns, we need to both establish the sensory variety of the products, as well as their scores on the alternative explanatory variables. A panel of four arts experts was instructed to rate the products on offer in the first three seasons on these variables. Our analyses focus on genre level and chosen combinations of genres. However, to ensure accurate rater judgments, experts were asked to rate all 744 packages

individually, rather than the ten genres. Scores were later weighed to calculate average scores for genres. Although judging packages instead of genres is a considerably lengthier process, it is likely to provide far more accurate rating values. Not only is it easier for experts to judge particular packages based on their individual details, but overall values for genres will be based on many different observations rather than on a single global impression.

Two main experts, each holding two different arts degrees and with broad professional working experience in arts education, rated the 744 packages of the first three seasons. The third panel member, an autodidact expert in classical music, only rated the classical music packages. The fourth panel member, holding one arts degree and an expert on drama, only rated the remaining packages. The panel was instructed to rate packages based only on the information in the annual brochure and was specifically urged to judge them from the consumer's perspective. As such, ratings do not represent expert opinion on artistic quality, but are an expert estimate of consumer perception. All sixteen variables were rated on a 100-point scale.

Auditory – visual character. Each package was judged on which sensory modality was more important in enjoying the performances, on a scale ranging from totally visual to totally auditory. As the notion of individual differences in sensory modality dominance is new, there is no scale available in the literature to measure the auditory versus visual nature of products. We choose to instruct the experts to rate 'how much there would be left to enjoy of the performances if the visual or auditory modality of the attendee would be defective'.

Indicators of renown. Akin to the literature on customer based brand equity (Keller 1993), we distinguish between 'familiarity' and 'perceived quality'. For each component – pieces, authors, performers and location – of every package, experts were asked to judge both its familiarity among consumers and the quality as likely to be perceived by consumers. In the rating instructions, quality was specifically distinguished from artistic quality and defined as 'the extent to which, in the consumer's perception, it represents the top in that particular genre'. In other words, famous authors of popular work, such as major musicals, may receive a similar rating to famous authors of classical works.

Motivation variables. For each of the four motivations identified earlier – esthetics, entertainment, excitement and empathy – experts were asked to judge how well they would be addressed by each package.

Deterrent variables. Unlike the movie industry, for the performing arts there are no secondary data (such as "G" and "R" ratings) or proxies, like 'foreign' in the case of movies. Therefore, the experts were asked to judge each package on the three deterrent variables: how confronting the performances are, how much (genre) knowledge is required to fully enjoy them, and how unconventional they are.

With the two main experts, three test rating rounds were held for a selection of fifty packages that represented the variety on offer. Discussions about rating instructions and results were held after each test round. Ambiguous definitions were identified and reworded. After the third test round, consistency between the two main raters showed a Single Measure Intra Class Coefficient (ICC) of 0.74 (alpha 0.85). In a concluding discussion on the training results, final ratings for the fifty packages were agreed upon. These fifty packages with their final ratings served as an extra guide for further rating. The two other experts only received the final instructions and performed one test round on the selected fifty packages. The final instructions were deemed satisfactory as, compared to the final ratings of the main two experts, expert three showed an ICC of 0.83 (alpha 0.91) for classical music packages and expert four showed an ICC of 0.68 (alpha 0.81) for all other packages. After this rest round, experts three and four also received the final ratings of the fifty packages as an additional guide for further rating.

To aid the rating process as well as to ensure correct processing of judgments, a software application was developed. For each package, experts were shown one screen with sliders for every variable and were asked to move the sliders according to their judgments for that package. To avoid rater fatigue, the application was installed on their home computers and the experts were instructed to carry out the task at their own pace. In total, the rating of the 694 packages remaining after training took place over a period of approximately four months. As an extra check for rater fatigue, results were checked for large rating differences. In less than 5% of the ratings, differences were greater than 50 points. The experts were asked to check their verdict on those items, without information about the other expert ratings. Most of these differences were due to fatigue or misunderstanding and were corrected.

For the two main experts, the ICC for the 694 packages was 0.84 (alpha 0.91). The ICC for the two main experts and expert three for classical music packages was 0.86 (alpha 0.95); for the two main experts and expert four for all other packages, ICC was 0.79 (alpha 0.92). Given the size and complexity of the rating task, this was deemed satisfactory. Each package has three ratings; for the final scores per variable per package, the average was taken of the two closest ratings. Also, to negate any differences across the three years (e.g., more entertainment or more complex performances in a particular year), the average ratings of packages were standardized by subtracting the annual mean.

4.4.2. Analyses

We evaluate relevance of consumers' sensory modality dominance in performing arts choice behavior in four stages. First, we determine differences between the ten genres on their average rater judgments (e.g., sensory modality addressed). Observed combinations in which consumers attended different genres are then investigated. Next, we test whether these combinations support the influence of sensory characteristics of performing art

genres instead of other genre characteristics. Finally, we investigate the predictive validity of our findings. Below we provide details on these four stages.

First, based on the rating data for individual packages, we evaluate whether the genres differ in the renown of pieces, authors, performers and venues, in the motivations they address and their levels of deterrent aspects, as well as their auditory–visual character. Differences between genres would imply that these characteristics potentially explain the combinations in which consumers attend performing arts.

In the second stage, we investigate whether the 7.8 packages each customer acquired on average in the three seasons covering 1993/1994 to 1995/1996 reveal a latent unfolding scale. Analysis is conducted using MUDFOLD (Van Schuur 1997; Van Schuur and Kiers 1994), a probabilistic generalization of the deterministic unidimensional unfolding model (Coombs 1964), calibrated on pick-any data, similar to Holbrook, Moore, and Winer (1982). Many factors affect choice, and the outcome of a choice process is therefore a random variable. We evaluate to what extent this seemingly random outcome is explained by assuming a single latent unfolding scale, such as the auditory-visual factor we propose or possibly another factor. A measure for the strength, H, for the unfolding scale is useful in this regard. The measure, H_i, for each individual product, indicates to what extent an unequivocal position can be allocated to product i on the unfolding scale. H and H_i can take on values ranging from 0 to 1 (Van Schuur and Kiers 1994; Van Schuur 1997). The value 0 indicates a random situation, while a value of 1 indicates that the unfolding scale fully explains the combinations in which individuals attended the performing arts. MUDFOLD can be used both as a confirmatory analysis and exploratory analysis. Here, we use the latter, so that any latent unfolding scale present in the dataset may emerge.

After the combinations in which consumers attended the performing art genres have been analyzed, the third step of the analysis evaluates which rater variables best explain the latent scales. We first calculate scores of consumers on the unfolding scales using the performing arts genres that this person has attended. We use this individual scale-position as the dependent variable in a regression model, with the rating variables as explanatory variables. If a scale of genres does indeed represent an auditory-visual ranking, then the auditory–visual rating variable should have a significant and a substantially greater impact on the derived scale-value than the variables representing the other performing art characteristics rated by the experts.

Finally, we assess the predictive validity of the sensory modality dimension. If consumers' individual sensory modality dominance influences their choice behavior, we would expect customers to have a similar auditory-visual score in the fourth season. To determine customers' auditory-visual scores for season one to three and season four, the number of chosen performances in the ten genres in those periods are combined with the auditory-visual rating averages for the ten genres to calculate a weighted average auditory-visual score for both periods. Correlations should indicate similar auditory-visual

scores for the transaction and the ratings data. Such correlations may, however, result from inertia. That is, rather than being driven by an optimum sensory modality point, AUB-customers may simply always choose the same genre out of habit, thus generating similar auditory-visual scores. The role of repeat purchase as alternative explanation is assessed by a series of binary logistic regressions, one for each genre. A dummy variable indicating whether a customer chose this genre in the fourth season serves as the dependent variable. Explanatory variables are a dummy variable indicating whether the genre was already chosen in the seasons one to three (indicating a repeat purchase) and the customer's average auditory-visual score for seasons one to three. To enable comparison of the regression coefficients, the average auditory-visual scores of customers are converted to a range of 0 to 1. If the auditory-visual score has predictive validity, its beta should be significant.

In sum, we first evaluate if we have chosen suitable characteristics for rating products by investigating differences between the performing arts on the rater judgments. Large differences imply that the attributes can potentially explain choices of combinations of performing art genres. Second, we investigate combinations in which consumers attend performing arts by ordering the performing art genres on the unidimensional unfolding scales. Third, we evaluate whether these scales reflect sensory modality or whether other variables explain the combinations in which performances are chosen. Finally, we analyze the predictive validity of the results of seasons one to three for choice behavior in season four.

4.4.3. Results

Differences between the genres. Ratings of the 744 individual packages were summarized into averages per genre (table 4.1). The genres differ substantially in the mix of senses addressed.

Packages in the genres Modern Dance and Ballet are highly visual, whereas packages in the genre Chamber Music are highly auditory. Packages in other genres address a mix of senses. On other variables rated by the experts, genres also share similarities and differences in various combinations. For instance, packages in both the genres Show and Stand-up Comedy require little art knowledge, but packages in Stand-up Comedy on average are far more confronting than packages in the genre Show. Also, the pieces performed in both Modern Dance and Stand-up Comedy are low on familiarity as both are often new, but the motivations they address are quite different. Given the average ratings for the genres, we may expect certain combinations of genres to be more likely than others. If individual differences in sensory modality dominance influence choice behavior, we would expect the genres to form a scale in the order presented in table 4.1. Art patrons should, for example, be more likely to combine Modern Dance with Ballet or combine Popular Music with Symphony Orchestra, than to combine Modern Dance with Popular Music or Ballet with Symphony Orchestra.

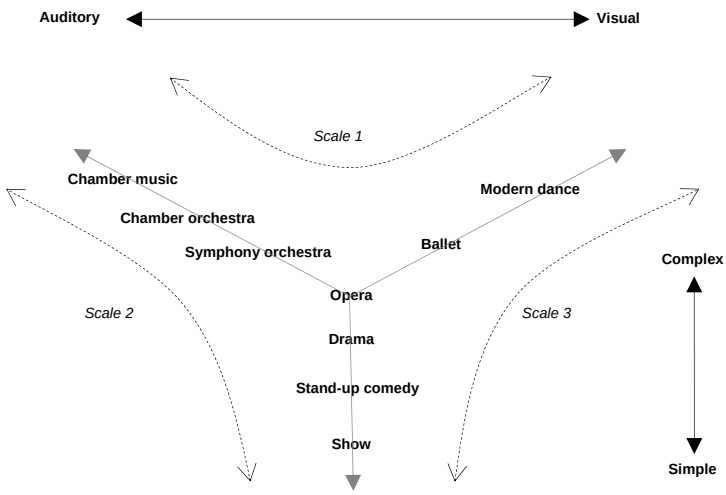
Table 4.1 Average score on the rating variables per genre

	Modern dance	Ballet	Drama	Opera	Show	Stand-up comedy	Popular music	Symphony orchestra	Chamber orchestra	Chamber music
Pieces familiarity	-19.95	4.31	9.98	19.64	7.63	-22.94	-23.68	20.86	9.10	3.30
	0.77	*2.72*	*1.74*	*1.93*	*4.41*	*1.32*	*0.29*	*0.74*	*1.28*	*0.69*
Pieces quality	-25.16	4.52	6.20	21.84	1.49	-30.59	-30.42	28.65	15.20	7.54
	1.00	*2.99*	*1.80*	*2.04*	*4.78*	*1.39*	*0.46*	*0.67*	*1.17*	*0.89*
Authors familiarity	-11.62	-7.12	15.42	13.75	-11.90	-30.01	-31.96	19.27	9.42	8.92
	1.34	*2.08*	*1.46*	*1.87*	*3.20*	*1.64*	*0.50*	*0.71*	*1.30*	*0.79*
Authors quality	-11.57	-5.49	11.62	15.19	-18.27	-38.30	-38.54	23.48	14.83	14.12
	1.55	*1.96*	*1.52*	*1.95*	*3.62*	*1.61*	*0.79*	*0.66*	*1.14*	*0.80*
Artists familiarity	-6.21	10.69	3.33	.24	-4.05	10.08	-20.34	9.38	12.70	2.07
	1.61	*1.86*	*1.05*	*2.04*	*3.46*	*1.46*	*1.94*	*0.58*	*0.63*	*0.54*
Artists quality	-4.81	10.09	.17	-.26	-2.90	7.05	-17.61	9.29	11.61	4.25
	1.41	*1.70*	*1.09*	*1.82*	*3.24*	*1.56*	*1.91*	*0.58*	*0.60*	*0.51*
Venue familiarity	5.25	8.17	-2.24	3.11	.25	-.74	-1.45	6.31	.65	-2.02
	0.39	*0.29*	*0.27*	*1.25*	*0.84*	*0.51*	*0.64*	*0.15*	*0.64*	*0.45*
Venue quality	3.60	7.10	-2.21	2.10	.14	.84	-.75	6.46	.31	-2.51
	0.47	*0.34*	*0.23*	*1.26*	*0.79*	*0.53*	*0.66*	*0.15*	*0.65*	*0.46*
Esthetics	5.46	7.73	-28.77	6.15	-33.12	-45.69	-19.59	23.05	23.77	23.69
	0.52	*0.64*	*0.72*	*1.25*	*1.58*	*2.01*	*1.23*	*0.26*	*0.37*	*0.28*
Entertainment	-12.44	-10.12	.63	-8.00	46.62	55.60	17.11	-18.66	-19.30	-17.97
	0.31	*0.59*	*1.16*	*1.25*	*1.65*	*2.18*	*1.43*	*0.12*	*0.17*	*0.24*
Excitement	-4.47	-4.17	-5.24	-3.01	31.39	14.58	29.58	-12.13	-12.62	-11.56
	0.41	*0.37*	*0.32*	*0.86*	*2.70*	*1.76*	*1.23*	*0.13*	*0.16*	*0.22*
Empathy	-6.49	.38	53.08	24.75	32.56	39.11	-4.52	-26.11	-27.45	-26.13
	0.72	*1.45*	*0.62*	*2.24*	*1.64*	*2.25*	*1.36*	*0.36*	*0.35*	*0.25*
Knowledge	20.77	7.90	-9.08	7.05	-27.57	-30.00	-3.30	6.34	15.40	9.70
	0.60	*1.18*	*0.83*	*1.43*	*0.81*	*0.71*	*1.54*	*0.67*	*1.22*	*0.60*
Confrontating	-1.10	-.67	1.45	-.83	-2.02	8.05	-1.97	-2.16	-2.25	-2.62
	0.12	*0.30*	*0.29*	*0.34*	*0.45*	*1.65*	*0.10*	*0.09*	*0.10*	*0.06*
Unconventional	16.17	5.23	-2.24	-2.37	-5.59	-2.34	5.32	-6.17	-4.44	-2.60
	0.84	*1.14*	*0.59*	*0.93*	*0.96*	*1.20*	*1.09*	*0.38*	*0.66*	*0.45*
Sensory modality	**-40.62**	**-39.32**	**-18.35**	**-16.03**	**-15.46**	**-3.45**	**3.57**	**14.29**	**16.38**	**17.73**
	0.56	*0.84*	*0.25*	*1.04*	*1.29*	*1.03*	*0.63*	*0.32*	*0.43*	*0.19*

Small print italics denote Standard Error

Scales derived from chosen combinations of genres. Analyzing the combinations of genres attended by the AUB customers, we expected to find a single unidimensional scale, relating to the auditory – visual character of the genres, as ranked in table 4.1, if that were the only latent variable to affect choice. Instead, the results of the exploratory MUDFOLD analysis revealed three unfolding scales, each partly overlapping with another scale. Together, they form figure 4.1:

Figure 4.1 The three MUDFOLD scales



The critical value of 0.30 is often used to assess whether a single dimension underlies the data patterns (Van Schuur and Kiers 1994; Van Schuur 1997). In figure 4.1, scale 1 has an H-value of 0.49 and H_i–values above 0.30 for all six products included. H and all H_i are significant at the .001 level. An H-value of 0.49 implies people often attend performing arts close to each other on the scale. For example, attendance to Modern Dance and Opera, without Ballet, is unlikely to occur. The intermediate product (Ballet) should be within the tolerance area of a consumer using both Modern Dance and Opera. The second scale has an H-value of 0.41, with all $H_i > 0.30$; H and all H_i are significant, $p < .001$. The third scale has an H-value of 0.39, all $H_i > 0.30$; H and all H_i are significant, $p < .001$.

Nine of the ten genres in our data set are represented in figure 4.1. Popular Music is excluded because the analysis suggests consumption of this genre is unrelated to the choice of other genres. This may be explained by the diverse nature of this genre; in this data set it includes both more conventional forms such as Dixieland jazz and country music as well as more avant-garde forms of rock music.

Consistent with our sensory modality dominance thesis, the ordering of genres on scale 1 is quite similar to the auditory – visual based ordering in table 4.1. This suggests that the combination behavior of six of the ten genres is strongly explained by the individual differences in consumers' sensory modality dominance and the levels of auditory and visual stimulation offered by these six genres. This auditory – visual hypothesis also seems relevant for the other two scales. Only here, the auditory – visual factor is combined with another factor that moderates the auditory-visual dominance effect. Scale 2 orders performing arts from the less complex, more entertaining genres (Show, Stand-up, Drama to Opera) to products that provide highly complex and esthetic auditory stimulation (Symphony Orchestra, Chamber Orchestra to Chamber Music). Scale 3 orders products, from simpler, more entertaining genres to genres providing highly complex and esthetic visual stimulation (from Show, Stand-up, Drama, Opera, Ballet to Modern Dance). In brief, the MUDFOLD analysis suggests a set of three scales in a two-dimensional space, consisting of the dimensions "complexity" and "sensory modality". The findings suggest the role of consumers' individual differences in sensory modality dominance is influenced by the level of complexity. It seems that sensory modality dominance particularly influences choice behavior for abstract, complex, esthetic performing arts.

Validating the scales. Although the three-scale model in figure 4.1 has face validity, we investigate to what extent consumers' positions on scale 1 are explained by the auditory-visual character of genres and not by other factors. Also, we investigate which factors explain consumer positions on scales 2 and 3. For the validation, three regression models were built. For each model, the individuals' scale-position on one of the scales serves as the dependent variable and rating variables on the various aspects of the packages are the explanatory variables.

Preliminary analyses show high multicollinearity between the fifteen alternative variables. Therefore, these fifteen alternative variables were subjected to a factor analysis. A four-factor solution, shown in table 4.2, explains 88.1% of the variance. The four factors are: (1) Entertainment versus Complexity: Strong positive loadings for required genre knowledge and 'esthetics', strong negative loadings for 'entertainment', 'excitement' and 'empathy'; (2) Unconventionality versus Familiar: Strong positive loadings for 'piece familiarity', 'piece quality', 'author familiarity' and 'author quality', strong negative loading for 'confronting' and 'unconventional'; (3) Artist familiarity/quality: Strong positive loadings for 'artist familiarity' and 'artist quality'; (4) Venue familiarity/quality: Strong positive loadings for 'venue familiarity' and 'venue quality'.

Table 4.2 Structure matrix of factor analysis on rating variables

	Component			
	1	**2**	**3**	**4**
Pieces familiarity	.458	**.953**	.251	.144
Pieces quality	.557	**.956**	.300	.193
Authors familiarity	**.734**	**.854**	.423	.115
Authors quality	**.822**	**.824**	.434	.168
Artists familiarity	.247	.266	**.974**	.196
Artists quality	.363	.312	**.961**	.253
Venue familiarity	.365	.142	.224	**.982**
Venue quality	.215	.007	.250	**.984**
Esthetics	**.962**	**.560**	.284	.310
Entertainment	**-.979**	-.490	-.297	-.185
Excitement	**-.867**	-.400	-.497	-.152
Empathy	**-.803**	-380	-.162	-.359
Knowledge	**.884**	.118	.208	.294
Confrontating	**-.626**	**-.557**	.106	.001
Unconventional	-.092	**-.808**	-.166	.109

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.

The four factors were included in the regression analysis, along with sensory modality, as explanatory variables. The main results are presented in table 4.3:

Table 4.3 Main results of the regression analyses explaining consumer scale positions

Independent variable	**Stand. betas scale 1**	**Stand. betas scale 2**	**Stand. betas scale 3**
Entertainment vs. complexity	-0.082*	**0.658***	**0.704***
Unconventionality vs. familiarity	-0.059*	0.026*	-0.052*
Artist familiarity/quality	0.039*	0.008	0.066*
Venue familiarity/quality	0.102*	0.096*	0.245*
Sensory modality	**-0.770***	**0.378***	**-0.237***
r-square	0.690	0.762	0.647

*For all X-variables VIF<1.5. All effects with * are significant at the 0.001-level.*

Table 4.3 shows scale 1 is strongly related to the auditory–visual properties of the six genres in the scale. The auditory – visual rating has a strong impact on consumer-positions on scale 1, while other judgments have modest effects. Positions on scales 2 and 3 are also related to the auditory – visual rating. However, for these scales, complexity also plays a role. The modest role of Venue quality and familiarity in scale 3 is most likely caused by the particular market structure of the genres involved. Modern Dance, Ballet and Opera all require large stages and are, thus, hosted at larger venues. The entertainment genres, particularly Stand-up Comedy, are hosted more often at smaller venues and particular restaurants and clubs. This effect is probably absent for scale 2, as Chamber Music is often held at smaller venues, like Stand-up Comedy.

Predictive validity. Since the previous stages have shown an additional role for complexity, a similar weighed average score for this variable was calculated from the genre averages for the rating variable "required (genre) knowledge". Pearson correlation for the auditory-visual scores of seasons one to three and season four was .772. Similarly, for the average complexity score, Pearson correlation was .763; for both correlations $p <$ .01. These correlations seem satisfactory.

To assess the role of inertia as an alternative explanation for these correlations, a series of genre-level logistic regressions was performed, with repeat purchase and auditory-visual scores as explanatory variables. Because of the additional role of complexity shown in the previous stages, the customer's average complexity score of season one to three was added as an explanatory variable. Similar to the auditory-visual score, this variable was converted to a minimum of 0 and maximum of 1 to allow for comparisons of the regression coefficients. The results are presented in table 4.4:

Table 4.4 Main results of the logistic regressions per genre

Genre chosen in season 4	**B**				**R^2**
	Repeat	*Aud-Vis*	*Complexity*	*Constant*	
Modern Dance	1.778	-3.242	3.897	-1.099	.517
Ballet	1.504	-1.168	-.146 *NS*	-.129 *NS*	.172
Drama	2.212	-1.433	-.831	.908	.310
Opera	1.267	-1.860	.750	.035 *NS*	.169
Show	1.428	-1.360	-3.668	1.854	.333
Stand-up Comedy	1.887	-.384*	-3.216	1.166	.378
Pop/Jazz	1.717	-.436**	-1.851	.402	.208
Concert	2.293	1.496	.964	-1.613	.367
Chamber orchestra	1.014	2.329	1.586	-3.136	.224
Chamber music	2.159	2.482	2.319	-3.058	.466

NS = not significant
** = sign. at .05 level*
*** = sign. at .01 level*
all other values sign. at .001 level
R^2 = Nagelkerke's R^2

From table 4.4, three observations can be made. First, the effects of sensory modality and complexity are as expected. Regression coefficients for the various genres follow the same order as the scales in figure 4.1. Only the beta for sensory modality on ballet is lower than expected. Second, for all regression models, the effects of sensory modality and complexity are significant, in spite of the inclusion of repeat purchase as an alternative explanation. Third, for seven out of ten genres, the regression coefficients for sensory modality and complexity are higher than for repeat purchases. For the other three, the regression coefficients of sensory modality and complexity are large. Thus, even when taking repeat purchases into consideration, sensory modality and complexity still substantially contribute in predicting choice behavior. Furthermore, the sign and magnitude of the regression coefficients again underline the ordering and interpretation of figure 4.1.

4.5 Discussion

Giard and Peronnet (1999) and Fort et al. (2002) have shown individual differences in sensory modality dominance to exist in small-scale laboratory settings. Our aim was to investigate whether such individual differences influence actual consumer choice behavior as manifested in the market place. We showed that performing arts genres provide a good testing ground, with genres differing in both the sensory modality addressed as well as a number of alternative choice criteria, such as brand equity aspects, motivations and deterrents. A subsequent analysis of the chosen combinations of genres revealed three unfolding scales, correlating highly with sensory modality and complexity ratings. Finally, both sensory modality and complexity were shown to be significant in predicting choices for a new season, with often stronger effects than repeat purchase. In conclusion, our findings support our central research question of whether consumers' choice behavior exhibits sensory pattern regularities consistent with sensory modality dominance.

As summarized in figure 4.1, we found three scales that underlie choice behavior. The results indicate that individual differences in sensory modality dominance influence choice behavior, but that this influence is moderated by complexity. Scale 1, ranging from highly auditory to highly visual, is confined to complex products only. Scales 2 and 3 both start with simple products, and progress to more complex products. Only at a particular level of complexity do these scales follow an auditory-visual pattern. Although an unexpected result, in hindsight this seems plausible. We may presume that all consumers have a basic capacity for processing any sensory information, regardless of which sense is more developed. Simpler forms of entertainment should thus, regardless of sensory capabilities, be accessible to any consumer. Possibly, in choice behavior, individual differences in sensory modality dominance will thus only be revealed when consumers select between more complex performance types.

Most consumer research into sensory appreciation has focused on a single sensory domain, such as auditory esthetics (Lacher and Mizerski 1994; e.g., Holbrook 1981; Wansink 1992) or visual esthetics (Bloch, Brunel, and Arnold 2003; Veryzer Jr. and Hutchinson 1998). In hedonic consumption, the senses are presumed to interact and to be experienced holistically; a proposition explored in depth by Joy and Sherry (2003). By focusing on just a single sense we may lose sight of how senses interact. For instance, Bloch et al. (2003) show that consumers may differ in the centrality of visual esthetics. The present study raises the question whether a low score on such a scale means that another sense is more central (e.g., centrality of auditory esthetics), rather than no centrality of any esthetics. The contribution of the present study is that it shows that within the 'multi-sensory aspect' one modality may be more important than others, that consumers appear to differ in this respect, and that this is reflected in their choices.

Particularly in choice behavior, seeking such sensory pleasure and avoiding sensory satiety have been found to be an important driver of variety seeking (Inman 2001). So far, variety seeking has only been investigated within a particular product

category, such as different flavors of yoghurt or snack food. Where variety seeking *within* a category often involves a different stimulation of the same sense (e.g., taste: a different flavor), variety *across* categories more often involves a different sense being addressed (e.g., music versus video). Our study shows that such cross-category variety seeking is confined by the dominance of particular sensory modalities. Additionally, one may expect sensory satiety, and hence variety seeking, to occur quicker when the product category does not match the consumer's dominant modality. For instance, in choosing songs to listen to (cf. Ratner, Kahn, and Kahneman 1999), a visually dominant consumer may quicker get satiated and seek more variety than an auditory dominant consumer. Also, pop music video as opposed to just pop music (cf. Goldberg, Chattopadhyay, Gorn, and Rosenblatt 1993) may less wear out for both auditory and visually dominant consumers as it addresses both modalities.

Apart from hedonic responses as a consumption goal in it self, a substantial body of research has investigated the influence of (background) music in retail environments. For instance, music has been found to play a role in service perceptions (Caldwell and Hibbert 2002; Hui, Dubé, and Chebat 1997); intended patronage of shops (Grewal et al. 2003); atmospherics (Mattila and Wirtz 2001); or time perception when waiting in queues (Oakes 2003). As sensory modality dominance ranges from auditory to visual, effects found in such studies may be more pronounced for some segments, while less so for others. None of the studies mentioned account for heterogeneity in sensory susceptibility. The results of our study suggest that it may be fruitful to do so.

Our findings suggest that individual differences in sensory modality dominance are reflected in choice behavior for more complex products. However, the implications of the phenomenon are likely to go beyond choice behavior and also pertain to information processing. In both Fort et al. (2002) and Giard and Peronnet (1999), respondents were asked to distinguish a simple change in either the auditory or visual part of a bimodal stimulus. Individual differences in sensory modality dominance were evident in different reaction times, with some respondents reacting faster to auditory changes and others to visual changes. If individual differences in sensory modality dominance play a role in such simple experimental tasks, it is likely to also influence processing of low complexity multi-sensory information sources, such as commercials, and multi-sensory products, such as performing arts, television series, movies and computer games. As our approach was based on 'revealed' preferences, we cannot determine the influence of the phenomenon on processing. Additional research is needed to confirm its role beyond choice.

While we do not show a direct causal link between individual differences in sensory modality dominance and choice behavior, there appear to be sensory patterns in choice behavior that are supportive of this thesis. Although this interpretation is corroborated by the correlations with expert ratings, future research with direct measurement of individuals' sensory modality dominance is necessary to more formally establish this link.

5. Market Structure in Museum Visiting: *Employing Travel Time to Compare the Value of Competing Cultural Organizations*

In the museum sector, supply is spread mostly geographically. Whilst museums try to encourage repeat visiting by putting on temporary exhibitions, it is common in museum visiting to seek variety by visiting different museums. Here, marketers are particularly faced with the question how far consumers are willing to travel to satisfy their need for variety. We argue that this willingness to travel may also be used to compare use value of organizations. This is an important issue in public economics, where estimating the value of non-market goods is necessary to determine the appropriate level of government funding. A number of shortcomings in this area are identified, such as the use of stated preference methods, the focus on single case studies and the assumption of a homogeneous market. We argue that with transaction data, use value can be determined by actual choices, whilst allowing for the comparison of multiple organizations and accounting for heterogeneity. Two methodological issues in using such data are pinpointed, such as the particular distribution of museums and inhabitants across a nation, and the potentially confounding role of multi-purpose visits. We propose a mixture solution of a logit model to address these issues. Results reveal four segments that differ in their willingness to travel and in the ranking of the utility of museums. The interpretation of these segments suggests that mixture models may be a potentially fruitful way to account for the effect of multi-purpose visits.[10]

5.1 Introduction

An important area in cultural economics is determining the social value of cultural goods, particularly in relation to the level of government subsidy. A number of studies have tried to justify the use of public funding by investigating the value people place on particular cultural goods. The latest development in this field has been the use of non-market valuation techniques. Applications have covered a variety of national issues such as a general willingness to support the arts (Thompson et al. 2002) or television programming (Finn, McFadyen, and Hoskins 2003; Papandrea 1999), as well as a number of single site cases, such as the Bosco di Capodimonte park (Willis 2002) and Napoli Musei Aperti

[10] This chapter is based on Boter, Rouwendal and Wedel (2005), "Employing Travel Time to Compare the Use Value of Competing Cultural Organizations," *Journal of Cultural Economics*, 29 (1), 19-33. We are grateful to the Dutch Museum Association for providing the dataset and the VU Spinlab for help in generating figure 5.1.

(Santagata and Signorello 2000) in Italy, Lincoln Cathedral in England (Pollicino and Maddison 2001), a historic shipwreck park in North Carolina, United States (Whitehead and Finney 2003), or the Royal Theatre of Copenhagen in Denmark (Hansen 1997).

In reviewing this development, three observations can be made. First, almost all of these applications are based on stated preferences (see also Navrud and Ready 2002). The main advantage of stated preference techniques is that they can capture both use value and non-use value of a cultural good. The validity of the respondent's answer to a hypothetical question, however, has raised considerable debate (see Noonan 2003; Throsby 2003). Also, subtle, seemingly irrelevant changes in the information about the good, the response format, or the question sequence can have substantial effects on the elicited willingness to pay (e.g., Green, Kahneman, and Kunreuther 1994). Revealed preferences, such as those in evidence in the distance or time traveled by visitors, have the advantage of modeling actual behavior in real life situations. We believe that for measuring use value, either as a single component (Forrest, Grime, and Woods 2000; Poor and Smith 2004) or as part of estimating total value (Martin 1994), these techniques merit more research interest than has been the case so far in cultural economics[11].

Second, virtually all of the applications of non-market valuation techniques in cultural economics have been limited to single case applications. Navrud and Ready (2002) voice the general concern that single case studies may be biased; the measured WTP may reflect the respondent's general attitude to all similar goods rather than the particular good in question. If estimates of social value are to represent realistic values, one needs to introduce choice options in the measurement process, especially since choice among complementary or substitute alternatives are an important aspect of consumers' valuation of cultural goods. So far, applications with choice options have consisted only of choices within one site or organization (e.g., Alberini, Riganti, and Longo 2003; Finn, McFadyen, and Hoskins 2003; Whitehead and Finney 2003). There have been no attempts to determine the relative value of an organization or site in comparison to competition.

Third, with the exception of Morey and Rossmann (2003), non-market valuation studies into cultural goods so far have not considered differences in preferences. However, several recent studies in cultural economics have shown that there is substantial heterogeneity in preferences, with segments of people differing in their patronage behavior (e.g., cinema: Cuadrado and Frasquet 1999; music: Prieto-Rodríguez and Fernández-Blanco 2000; theater: Corning and Levy 2002). Morey and Rossmann (2003),

[11] Epstein (2003) argues that revealed preferences, too, may be called into question. As Epstein correctly points out, exchange value is not the same as use value; it is only a minimum bound. However, our aim is not to determine the absolute use value, but the relative value of organizations in comparison to others. Assuming that the average difference between exchange value and use value is the same for all museums, this issue seems negligible here. In addition, Epstein argues that choices may in hindsight be regretted and therefore not truly reflect preferences. Assuming that such erroneous choices are not structural, this would be captured in the error term in our model. Given that we base our estimation on 80,821 people making 346,978 choices, we believe that such errors are unlikely to influence our results.

too, find segments that differ in their willingness to pay. Hence, it seems likely that there are segments that differ in how they rank competing cultural organizations in their utility.

The aim of this study is to show how *revealed* preferences, in this case revealed through willingness to travel[12], can be used to compare the relative value of *multiple, competing* cultural organizations. In particular, we show the importance of accounting for the different probabilities of visiting these organizations, given the consumers' relative distance to the various sites. In addition, we show that the market is heterogeneous in how cultural organizations are ranked in their utility.

The remainder of this study is organized as follows. First, we introduce the Dutch National Museum Card organization and their data on the visiting behavior of their cardholders. Using the revealed preferences of 80,821 cardholders for 108 museums across The Netherlands, we show that two simpler forms of ranking, total number of visits and average travel time of visitors, reveal very different rankings of museums due to the different distributions of people and museums across the country. For this reason, we argue that a site choice logit model is more appropriate as it accounts for the likelihood of visiting a particular museum. We then develop a latent class application of a logit model and show that there are segments of museum patrons that differ in their willingness to travel. We conclude with a discussion of the results and limitations and suggest directions for future research.

5.2 The Dutch National Museum Card

In The Netherlands, an important tool in promoting museum attendance is the National Museum Card, issued by the Dutch Museum Association (NMV). In return for an annual fee of € 25 for adults or € 12.50 for anyone younger than 26 years, card holders get free access to 442 museums in this country; the only remaining cost per visit being the cost of traveling. At the 150 largest participating museums, card holder visits are logged electronically. These data are collected and stored on a central server to aid reimbursement to the museums. The Dutch Museum Association supplied us with the transaction data of the visits to these 150 museums for the period March 2000 – January 2003.

Fields in the dataset provided are the customer number, type of card (youth or adult), the museum, the date and time of the visit, and the zip codes of both museum and visitor. Using a commercial GIS database that contains travel distance and travel time by road for every zip code combination in The Netherlands, travel distance and travel time were added to the dataset for each recorded visit. As the choice for some museums may differ across seasons, we selected the visits of one full year (2002) from this dataset, so

[12] Another type of revealed preferences, hedonic pricing, is not discussed here. In hedonic price techniques, market goods have different levels of a non-market good as add-on benefit. By comparing the different prices for the different levels of the non-market good attached to the market goods, one can infer the marginal implicit price for this non-market good. An example mentioned by Navrud and Ready (2002) is the influence of cultural heritage goods on house prices. Such techniques seem more appropriate for monuments than museums, the subject of this study.

that all seasons are represented equally. Unfortunately, not all of these 150 museums had provided visiting data for all twelve months. Some of the museums are not open all year round and some museums faced incidental closure due to major refurbishments. To avoid distortion of the results by these temporary closures, only museums that were able to provide data for all twelve months were retained. This subset of 108 museums shows substantial variation in size, type of collection and location. Table 5.1 presents the key figures of the resulting dataset.

Table 5.1 Overview of the dataset

Number of museums participating	108
Youth card holders in the dataset	12,688
Standard card holders in the dataset	68,133
Total number of cardholders (Youth + Standard)	80,821
Number of visits recorded in dataset	346,978
Average number of visits per cardholder	4.3
Average number of different museums visited per cardholder	3.3
Average travel time in minutes	44.9

As shown in table 5.1, on average card holders made 4.3 visits to 3.3 of the 108 museums in our dataset; i.e., occasionally, museums were visited more than once. Note that the average of 4.3 visits is not caused by a lack of choice. A preliminary analysis of the dataset reveals that within the common willingness to travel of 44.9 minutes, the average card holder has 29.5 out of the 108 museums to choose from. The museums visited are therefore likely to reflect a real utility to the card holder.

The size of this dataset has the distinct advantage that it captures a wide range of different museums, locations, competitive situations and travel distances. As such, we believe it is a good starting point to explore the visitors' willingness to travel and to compare museums in this respect. However, there are several disadvantages to using transaction data such as these that should not be left unnoted.

First, we have very limited socio-economic information on the visitors - only age as a dummy variable (youth card or adult card). Also, the size of the party is unknown; the system does not register whether some card holders travel together. In conventional travel cost method applications, travel distance or time are multiplied by a percentage of the wage rate to estimate travel costs. Other socio-economic variables are often used as control variables (cf. Forrest, Grime, and Woods 2000; Poor and Smith 2004). Because such information is unavailable here, we can only compare travel *time* and assume all visitors to be equal in their costs per travel unit.

Second, the data set holds no background information on the nature of the trip. We do not know whether a particular part or exhibition of the museum was visited. Here, we assume this to be captured by the overall attractiveness of the museum. Of greater concern is that we do not know whether a visit was part of a multi-purpose trip and how travel time thus has to be valued. We will return to the issue of multi-purpose trips in the final

stage of our model and suggest a possible solution to this issue. Similarly, museum visiting is likely to be a social activity and card holders will have made visits together with other card holders (e.g., when every family member has a card) or with other non-card holders. However, there is no information on the composition of groups and we have to treat every card holder visit as an individual trip.

Finally, museum card subscribers are likely to be museum visitors who anticipate going more often and for whom the card is a financially attractive option. Although the card enjoys broad popularity, we cannot assume the card holders to be representative of all museum visitors[13]. The results thus reflect the value for a large, but particular group of visitors.

5.3 Comparing museums by use value

5.3.1. Ranking by key indicators

In museum management practice two key indicators seem prevalent in analyzing and reporting the value the general public places on the museum. The first and foremost is "number of visitors". It is the most readily available statistic on museums and allows for easy measurement and communication of success. The second key indicator often used is "average travel time" or "service area", measured in questionnaires by asking zip codes or nationality. The ability to attract visitors from a wide area seems equally suitable in communicating a certain position in the field. Furthermore, data on "average travel time" or "service area" are tightly connected to strategic choices in the level of communication efforts or the level at which private or public funding can be attracted (i.e., local, regional or national). Sometimes, this is communicated as an economic value, as increased tourism may result in additional spending in that area (*cf.* economic impact studies).

Popular perception is that large or "Superstar" museums attract many visitors from further away (e.g., Frey 1998), whereas smaller museums attract many fewer visitors and have a smaller service area. In this view, either "number of visitors" or "average travel time" as a measurement of use value would likely result in a similar ranking. As both seem readily available and are easily calculated from the transaction data, the question arises why – if our only aim is to compare museums in their use value – we cannot simply use either variable for this ranking. However, as shown in table 5.2, the two variables lead to a very different ranking of museums.

[13] Note that, while foreign tourists are also unlikely to hold a Dutch Museum Card, it is common for this kind of study not to include this group anyway. The aim of these studies is to investigate whether public funding of public goods on behalf of *tax payers* reflects the value these tax payers attach to these goods. Their power to attact tourists may also be a reason for public funding of museums, but is based on an economic advantage: the question whether the investment in attracting tourists to a region will be sufficiently covered by tourist spending in that region. Such considerations (together with other, broader economic considerations) are often captured in *economic impact studies*.

Table 5.2 Top ten museums by total number of cardholder visitors and by average travel time of visiting cardholders

Museum	# visitors
1. Rijksmuseum Amsterdam	34,236
2. Stedelijk Museum Amsterdam	23,067
3. Haags Gemeentemuseum	22,250
4. Groninger Museum	18,527
5. Van Gogh Museum	17,301
6. Cobra Museum Amstelveen	12,540
7. Singer Museum	11,343
8. Mauritshuis	10,173
9. Amsterdams Historisch Museum	9,580
10. Joods Historisch Museum	8,695

Museum	Avg. travel time in min. (single trip)
A. Natuurcentrum Ameland	233.1
B. Industrion	130.3
C. Bonnefantenmuseum	119.6
D. Zeeuws Biologisch Museum	117.8
E. Groninger Museum	101.7
F. Natura Docet Natuurmuseum	95.9
G. Marinemuseum	86.1
H. Fries Museum	80.4
I. Limburgs Museum	78.6
J. Hannema-De Stuers Fundatie	78.0

When the relative value of a museum is judged by its number of cardholder visits, the Rijksmuseum Amsterdam is by far the most valued museum. However, when the relative value of a museum is judged by the average travel time of the visiting cardholders for a single trip, the Natuurmuseum Ameland is the most valued museum. In other words, museums that attract the most visitors are not necessarily the museums that attract people from a greater area and vice versa. In table 5.2, only the Groninger Museum scores high in both types of ranking. Note that the long average travel times for some of the museums in table 5.2, particularly the Natuurmuseum Ameland, also raise the question whether these are single purpose trips, an issue we will return to later.

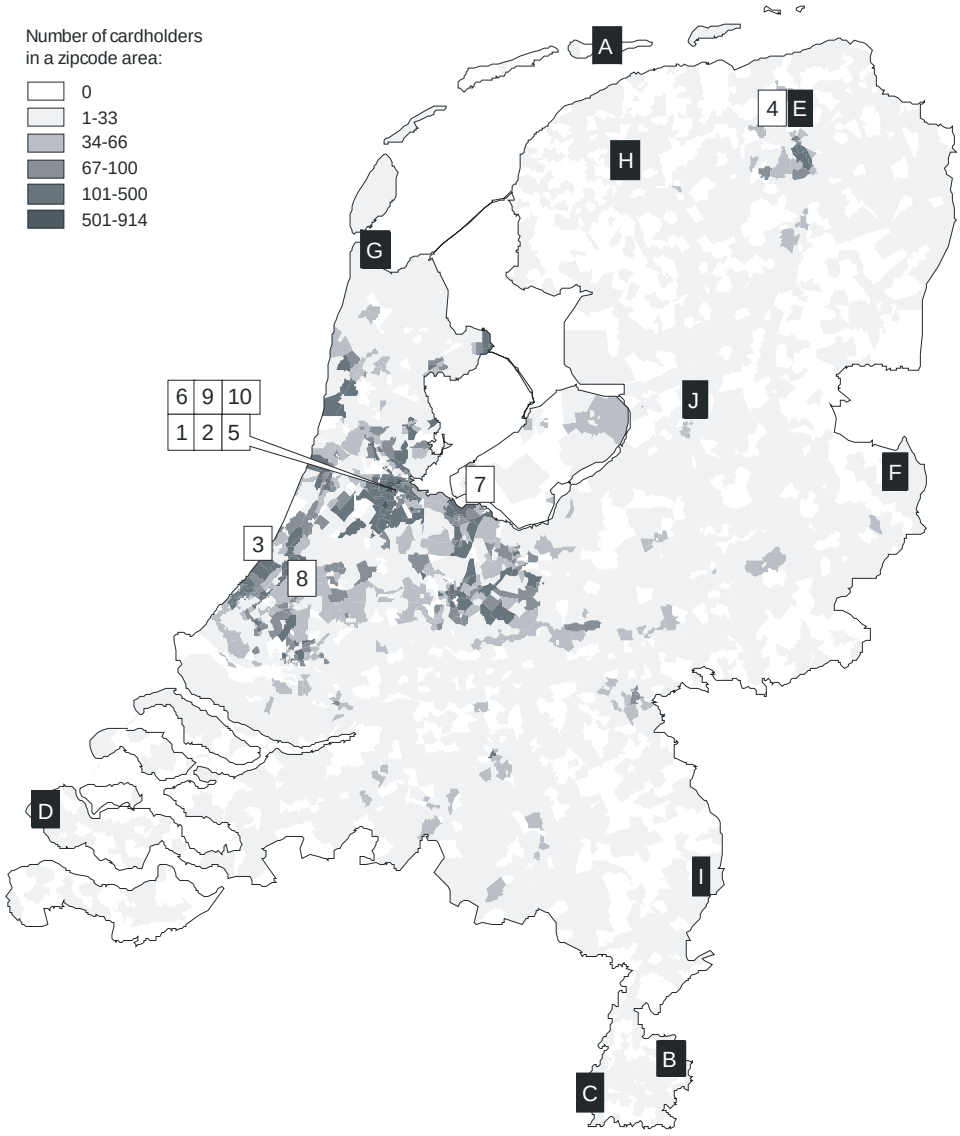
Explanation for the different outcomes of the two variables can be found in the different distributions of people and museums across the country. Nine of the ten museums ranking highest in number of visits are located in or near the “Randstad”, the most densely populated area of The Netherlands, formed by the four largest cities of the country and their suburbs. In fact, six of the top ten museums ranked by number of visits (1, 2, 5, 6, 9, and 10) are located in the capital city of Amsterdam (figure 5.1).

With so many more cardholders living in their direct vicinity, it is not surprising that these museums find it easier to attract a larger crowd. Museums that are located in more rural areas are therefore at a disadvantage when value is measured in terms of number of visitors. On the other hand, however, the ten museums ranking highest in average travel time are all located in the periphery of the country. A peripheral location allows for a greater travel time, with the largest possible distance from one border to another border as its maximum. Note that the maximum travel distance possible for a museum located in the centre of the country is only half this distance. Museums that are located centrally are therefore at a disadvantage when value is measured by average travel time of their visitors. This is particularly true in The Netherlands, where most distances back and forth can be covered in a single day.

Straightforward modeling of use value by “number of visitors” or “average travel distance” of visitors is only appropriate when all people and museums are distributed

equally. However, as shown, museums differ in the number of people in their vicinity and maximum travel distance through which visitors reveal the utility they perceive. As a simple model to compare multiple sites in their use value, either of these two variables seems inappropriate.

Figure 5.1 Number of Museum Card holders by 4-digit zip code area and locations of the museums in each top ten ranking



Note: Numbers and letters refer to the museums in each top ten ranking as tabulated in table 5.2.

5.4 Accounting for the spatial distribution of people and museums

Site choice models try to estimate which of several sites will be preferred and chosen by an individual. Visitors will have several sites to choose from on a given occasion. Each site offers different levels of utility to the potential visitor as well as different travel costs. The utility is inferred by comparing visitation patterns with the probability that a visitor would have chosen particular cultural goods. As the preceding discussion underlines, a method focusing on travel time for determining the relative use value of various museums would be enhanced substantially if it accounts for the different probabilities of visiting a particular museum. This is precisely what site choice models do. As far as we are aware, there have been no applications of site choice models in cultural economics.

The most common form of site choice modeling is the multinomial logit model. McFadden (1974; 1981) provides a choice-theoretic foundation for this model. Assume that the utility for respondent *i* of visiting museum *j* equals:

$$u_{ij} = \alpha_j + \beta d_{ij} + \varepsilon_{ij} \qquad (5.1)$$

This equation states that the utility that consumer *i* attaches to a visit of museum j is equal to the sum of 1.) the attractiveness α of that museum, 2.) the product of a negative coefficient β and the distance d_{ij} of this consumer's residential location to museum *j*, here measured in travel time, and 3.) a random variable ε_{ij}. Such a utility is defined for all consumers $i=1,\ldots,I$ and all museums $j=1,\ldots,J$. The attractiveness as given by the first term is determined by the quality of its collection, the way the collection is exposed, etcetera. If a consumer has to travel to visit this museum, the disutility of traveling should be subtracted from the attractiveness in order to arrive at the net utility of the visit. The linearity of the model implies that there is a simple trade-off between the utility of a museum and the disutility of traveling. The third term accounts for the fact that consumers differ in their appreciation of museums. The random part of the utility is assumed to have expectation 0, and α_j can therefore be interpreted as the utility of visiting museum *j* corrected for traveling distances. Note that (ticket) price is not part of our formulation, since we analyze card holders, who have free access to all museums in the dataset. The consumer visits the museum that offers the highest utility as given by (5.1). Since utility is a random variable, we can only determine the probability that a particular museum will be the one with the highest utility. The probability that museum *j* will be the one with the highest utility for consumer *i* can be determined as:

$$p_{ij} = \frac{e^{v_{ij}}}{\sum_m e^{v_{im}}} \qquad (5.2)$$

where v_{ij} denotes the so-called deterministic or systematic component of the utility u_{ij}:

$$v_{ij} = \alpha_j + \beta d_{ij} \qquad (5.3)$$

This (5.2) is the standard multinomial logit (MNL) model. For details we refer to McFadden (1974; 1981), Ben-Akiva and Lerman (1985) or Cramer (2003).

We have (arbitrarily) chosen the Groninger Museum as our reference (α_r) and have estimated the relative attractiveness of the other museums (α_j) to the Groninger Museum (α_r). Table 5.3 shows the results for the top ten museums with highest estimated parameter α_j-α_r.

Table 5.3 Top ten museums by estimated parameter

Museum	α_j - α_r	Ranking by # visitors	Ranking by avg travel dist.
Groninger Museum	0	4	E
Rijksmuseum Amsterdam	-1.12540	1	-
Natuurmuseum Ameland	-1.19554	-	A
Haags Gemeentemuseum	-1.29904	3	-
Stedelijk Museum Amsterdam	-1.52027	2	-
Bonnefantenmuseum	-1.62294	-	C
Van Gogh Museum	-1.80791	5	-
Paleis Het Loo Nationaal Museum	-2.06020	-	-
Mauritshuis	-2.11333	8	-
Zuiderzeemuseum	-2.13590	-	-

Our base reference, the Groninger museum, is also the most attractive museum; all parameters of other museums are negative. More interestingly, the ranking includes both museums that scored high in number of visits, as well as museums that scored high in average travel time of its visitors (table 5.2), with the only museum that scored high on both variables as the most attractive museum.

5.5 Accounting for differences in willingness to travel

Although this application of a general site choice model is fair in that it accounts for the different probabilities of visiting particular museums, it does not take into account individual differences in willingness to travel caused by the different contexts of visits. Museum visits are likely to be part of a multi purpose trip. Differences in such contexts may lead to a different willingness to travel. For instance, one segment may prefer to visit museums in combination with any of the other attractions a large city has to offer. Another segment may like to visit museums as part of a short holiday break in that region. The nature of the trip is likely to influence the card holder's willingness to travel. By looking for segments that differ in their willingness to travel, we may find segments with different rankings of museums that are typical for the different contexts. The resulting

rankings would then also be fairer in comparing use value of each museum, as the museums are compared within a similar context.

In this paper we choose to focus on the finite mixture MNL model. An important advantage of this class of models dealing with heterogeneity of subjects is the simplicity of estimation (Wedel and Kamakura 2000). The latent class model assumes that consumers are heterogeneous in the sense that there are two or more segments with different preferences (see Wedel et al. 1993; Wedel and DeSarbo 1995). For each segment, behavior is described by a standard logit model, as discussed above. However, the parameters α_j and β are different for each segment. The random term in (5.1) implies that it allows for differences among consumers in the evaluation of museums, but it does so in a special way. In particular, it assumes that the parameters α_j, which give the expected value of the attractiveness of the museums, and β, which gives the resistance against traveling, are identical for all consumers. In many applications this is thought to be unrealistic. For instance, there are often reasons to suspect that there are different groups of consumers who differ in their appreciation for particular museums or in the disutility they attach to traveling. If we are unable to identify such groups on the basis of observable characteristics, we can proceed on the assumption that each consumer has a particular probability, say π_k , to belong to group *k*, *k*=1,..,*K*.

For individuals belonging to each group, the assumptions of the logit model are assumed to hold. This means that the utility that is attached to museum *j* by some individual *i* belonging to group *k* is:

$$u_{ij}^k = \alpha_j^k + \beta^k d_{ij} + \varepsilon_{ij}^k \tag{5.4}$$

And that the probability that such an individual chooses to visit museum j is:

$$p_{ij}^k = \frac{e^{v_{ij}^k}}{\sum_m e^{v_{im}^k}} \tag{5.5}$$

with:

$$v_{ij}^k = \alpha_j^k + \beta^k d_{ij} \tag{5.6}$$

Since we do not know to which group a consumer belongs, the probability that we observe consumer *i* visiting museum *j* is a weighted average of the logit-probabilities for the various groups, denoted as p_{ij}^{av} :

$$p_{ij}^{av} = \sum_k \pi_k \, p_{ij}^k \qquad (5.7)$$

This average probability (5.7) is the basis for the likelihood function. Estimation of the latent segments and the MNL models within each segment is done simultaneously by maximizing the likelihood function. The latent class model gives a non-parametric approach to the heterogeneity in the sample of respondents and it is often found that a limited number of mass points give a good fit to the data (see Heckman and Singer 1984). We estimated models with 2, 3 and 4 latent classes. Estimation of the model with 5 latent classes was impossible because of (almost) perfect separation[14]. The log-likelihood increases at a decreasing rate when more classes are distinguished. For each segment we estimate 107 attractiveness parameters, one distance decay parameter, and one parameter referring to the relative size of the segment[15]. The Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC) and the Consistent Akaike Information Criterion (CAIC) (Bozdogan 1987; Schwartz 1978) all point to selection of a model with four latent classes.

Although a few museums appear in the top ten rankings of multiple segments, overall the four segments differ substantially in their ranking (table 5.4 upper half). The top ten museums in segment 1 are mostly large art museums, located in the large cities in the Randstad (indicated by an *R*), the most densely populated area of The Netherlands. Segment 2's top ten comprise a mix of regional museums, three of which are concerned with local nature. The top ten museums of segment 3 are mostly large well-known museums in the Randstad with a variety of collections. Finally, the top ten museums in segment 4 are larger museums located away from the Randstad, again with a variety of collections.

Using the few variables available in the dataset, we can investigate some of the background of the four segments (table 5.4 bottom half). The segments seem to differ most in their willingness to travel, the percentage of youth cardholders, and the type of collection visited. Segments 1 and 2 have a very similar profile on most variables, but the willingness to travel of segment 2 is about half as large as that of segment 1. This may perhaps have to do with age, a variable that unfortunately is not registered in the dataset.

[14] The parameters in one segment 'exploded'; their absolute values became very large.
[15] The latter parameter is not estimated when all respondents are considered as a single segment. When two or more segments are distinguished, the attractiveness parameters of two museums with a relatively small number of visitors had to be fixed in order to prevent them to attain very large negative numbers, thereby causing numerical problems. Note that all museums included in the estimation procedure have at least 250 visitors. The model suggests therefore that some museums are unattractive for some segments. For these museums the attractiveness parameters have been set equal to –25. The implied choice probability is virtually equal to 0.

Table 5.4 Top ten museums by estimated parameter for each segment

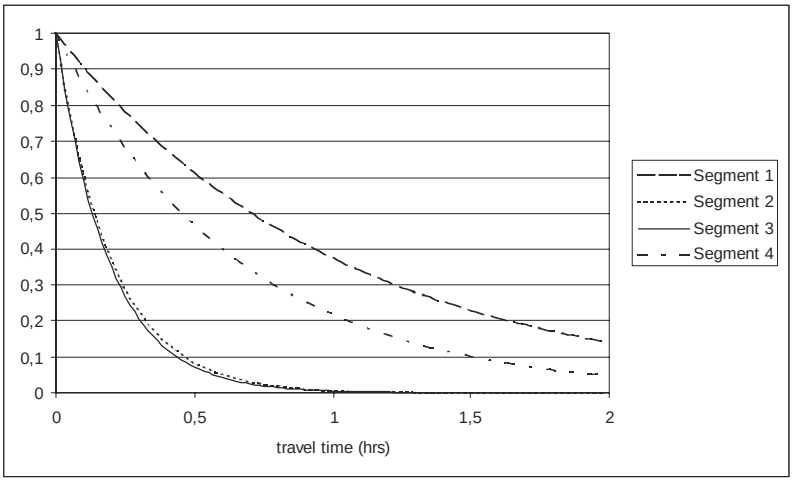
Segment 1 (45.1%)	$\alpha_j - \alpha_r$	**Segment 2 (19.4%)**	$\alpha_j - \alpha_r$	**Segment 3 (17.8%)**	$\alpha_j - \alpha_r$	**Segment 4 (17.7%)**	$\alpha_j - \alpha_r$
Groninger Museum	0.00	Natuurmuseum Ameland	3.91	Zeeuws Biologisch Mus.	1.01	Groninger Museum	0.00
	-		*13.9*		*4.7*		*5.1*
Rijksmus. Amsterdam *(R)*	-0.55	Groninger Museum	0.00	Zuiderzeemuseum *(R)*	0.71	Zuiderzeemuseum	-0.09
	53.8		*-*		*17.9*		*4.1*
Haags Gemeentemus. *(R)*	-0.70	Bonnefantenmuseum	-2.83	Rijksmus. Amsterdam *(R)*	0.61	Paleis Het Loo	-0.15
	55.5		*34.1*		*10.3*		*0.00*
Van Gogh Museum *(R)*	-1.15	Noord. Scheepvaartmus.	-4.21	Naturalis *(R)*	0.56	Naturalis *(R)*	-0.30
	84.8		*18.7*		*8.1*		*-*
Sted. Mus. Amsterdam *(R)*	-1.16	Natuurmus. Groningen	-4.24	Museon *(R)*	0.03	Natuurmus. Ameland	-0.37
	105.3		*23.1*		*7.9*		*2.7*
Mauritshuis *(R)*	-1.47	Industrion	-4.73	Amsterdams Hist. Mus. *(R)*	0.01	Bonnefantenmuseum	-0.90
	90.5		*20.0*		*6.8*		*10.2*
Singer Museum *(R)*	-1.49	Fries Museum	-5.04	Groninger Museum	0.00	Museon *(R)*	-1.04
	103.1		*55.2*		*6.1*		*10.0*
Bonnefantenmuseum	-1.52	Princessehof Leeuwarden	-5.47	Rijksmus. v Volkenkunde *(R)*	-0.21	Ned. Spoorwegmus. *(R)*	-1.10
	69.8		*45.8*		*4.3*		*20.0*
Cobra Mus. Amstelveen *(R)*	-1.72	Rijksmuseum Twenthe	-6.52	Tropenmuseum *(R)*	-0.23	Ecodrome	-1.22
	113.9		*52.6*		*4.0*		*20.4*
Joods Hist. Mus. *(R)*	-1.81	Fries Natuurmuseum	-7.07	Ned. Spoorwegmus. *(R)*	-0.23	Industrion	-1.22
	100.4		*45.2*		*1.6*		*20.1*
β	-0.98		-4.92		-5.28		-1.52
Avg travel distance in min.	**56.6**		29.7		24.3		**52.5**
Avg # of visits	**4.8**		**4.5**		3.7		3.3
% youth cards	10.5		11.3		**20.3**		**28.9**
% visits in school holidays	29.3		29.2		32.4		**40.6**
Type of collection visited:							
Art	**50.4**		**49.1**		**33.3**		**13.7**
Cultural history	39.4		34.2		33.5		40.6
Science/Technique	**5.8**		**11.5**		**19.0**		**30.1**
Other	4.3		5.2		14.1		15.7
Total	*100.0*		*100.0*		*100.0*		*100.0*

(R) = located in or very near to the Randstad
Small print italics below the attractiveness parameters ($\alpha_j - \alpha_r$) denote t-values

Segments 3 and 4 are also quite similar on a number of variables, but also differ substantially in their willingness to travel. In addition, segment 4 has a higher percentage of youth cards, and a subsequently higher percentage of visits during school holidays; the visitors of this segment are less likely to visit art museums, particularly in comparison to segment 1 and 2. Further analyses revealed that the segments are very similar in their distribution across the twelve counties in The Netherlands. The four segments simply have very different backgrounds and interests.

The four segments differ in their sensitivity to distance. The coefficients, β, are equal to -0.98, -4.92, -5.28 and -1.52, for segment 1, 2, 3 and 4, respectively. For segments 2 and 3 the friction caused by distances appears to be much larger than for the other two segments. This is illustrated in figure 5.2, which pictures the distance decay functions $\exp(\beta d_{ij})$.

Figure 5.2 Distance decay functions



The curves in this figure show the ratio between the probability that a particular museum will be visited if the distance to that museum is given by the value on the horizontal axis and the probability at distance 0. All curves start at the value 1, but the curves for segments 2 and 3 decline much faster than those for segments 1 and 4. Respondents belonging to segments 2 and 3 will hardly ever visit a museum for which they have to travel more than one hour. For respondents belonging to segment 1, one hour of travel time decreases the probability of visiting a museum by approximately 60%. Although this is still a substantial effect, it implies that museums that are sufficiently attractive still have a relatively large probability of being chosen. The position of segment 4 is in between that of segment 1 and segments 2 and 3.

Transaction data hold no direct information about motivations or reasons. However, in light of the previous discussion on multi-purpose trips and the influence of different contexts on willingness to travel, it is interesting to note that most of the museums in the top 10 of segments 1 and 3 are located in the major cities, suggesting that other amenities available in such urban areas may have influenced willingness to travel. Museums in the top 10 of segments 2 and 4, on the other hand, are mostly located in rural areas, with particularly the museums in the top 10 of segment 2 being typical destinations that are part of short holidays in the country. Without additional survey research we cannot be sure in how far the latent class application has adequately addressed the issue of multi purpose trips, and the tendencies to engage in them by these segments. The position of the Natuurmuseum Ameland, ranking first in segment 2 and ranking fifth in segment 4, suggests that the issue has not been addressed completely satisfactory. This museum, small and located on a island popular as holiday destination, is not only one of the few all weather attractions for tourists staying on the island, but also, as it requires substantial travelling by boat, is unlikely to attract any other type of museum visitor. As such, it may be an unfair comparison, even against other museums in tourist areas, which may additionally attract some share of single purpose visitors. While it seems tempting to exclude this museum from the analyses, we have chosen to maintain its inclusion as a test of the adequacy of our approach.

Overall, however, as the segments clearly differ in how the museum visits could have been combined (with city attractions or with a holiday in the country), we believe that accounting for heterogeneity at least constitutes an interesting avenue for further research.

5.6 Discussion

The aim of this study was to show that the use value of multiple organizations can be compared using travel time, but that one needs to account for the different probabilities in visiting the museums, given the consumers' relative distance to the various sites. Second, willingness to travel depends on a number of individual and situational differences and the market is thus heterogeneous in the utility function. We have developed a latent class logit model to address these two issues and have shown its application. We think that this approach has much to offer in valuing cultural goods such as museums, in particular since it shows the *relative* use value of competing museums. An important aspect of government subsidy for arts organizations is that multiple organizations contend for the same, limited budget. The summed social value of all potential arts beneficiaries is likely to exceed the available budget and choices will have to be made. Modeling relative use value may be of help in justifying the distributing limited governmental resources in particular ways.

However, as pointed out earlier, the dataset has both advantages and disadvantages. The major advantage is the size of the data set, capturing a wide range of different museums, locations, competitive situations and travel distances. The major disadvantage is the lack of information on nature of the trip. Although the latent class application addresses the issue of multi-purpose visits at least in part, much more research is required to determine how the context of a visit influences willingness to travel and how the context may be derived from travel distance. Advances in this area would contribute significantly to resolving an important shortcoming of many travel distance applications.

Another issue connected to the nature of the trip is the composition of groups. Museum visiting is likely to be a social occasion. However, there is no information in the dataset whether particular card holders have jointly visited a museum, let alone whether they have made a visit together with non-card holders. We have been forced to treat the trips as undertaken individually, which is not entirely satisfactory. Furthermore, as mentioned earlier, the database does not register which parts of the museum have been visited by the cardholders, whether they come for one exhibition in particular or just for the main collection. Blockbuster exhibitions in particular can have a substantial influence on attendance and willingness to travel and are not captured as such in our model. With the trend towards temporary exhibitions (Hutter 1998), this is a shortcoming of the present study. However, one might argue that to some extent, variables such as museum size or prestige partly account for this effect. It will be the larger, more prestigious museums that have larger exhibitions and therefore become more prestigious or grow in renown. Finally, Museum Card holders are likely to be museum visitors who anticipate going more often and for whom the card is a financially attractive option. Other segments, such as tourists or non-cardholders may be less willing to travel or their willingness may be influenced differently. For instance, for these segments a museum's prestige or renown may be more important in influencing their willingness to travel.

Although a survey would be limited in covering the number and range of museums, it might be an attractive next step to address some of the shortcomings of our data set. The factors in our model have been inferred from the limited user variables in the database. The survey would allow further investigation of audience segments and the use of other variables such as socio-demographics, type of transport or the role of particular exhibitions. The results of the present study can be a starting point in the design of such a study. This would enable combining the sources of stated and revealed preferences in a single model, to obtain even more accurate insights into the valuation of cultural goods by consumers.

6. Conclusion and Discussion

6.1 Introduction

After reviewing the marketing and consumer behavior literature on arts and entertainment, we argued that the large supply, needed to address consumers' need for variety and novelty in this sector, is one of the key characteristics of this field, and is posing particular challenges for both consumers and managers. We conjectured that the existence of and insight into market structures is important for the effective use of instruments addressing these challenges, such as bundling or presentation. We pointed to recent developments in transaction systems of arts and entertainment organizations, now enabling individual tracking of choice behavior and argued that such data seem well suited to investigate patterns in the heterogeneity of actual choice behavior in this market. Consequently, the central problem of this research was:

What insight into (customer based) market structures in arts and entertainment may be gained from transaction data?

We presented four studies that differ in the type of arts studied and the consequences of the large supply. Four specific research questions guided our use of transaction data:

1. What are appropriate methods for analyzing these transaction data?
2. What clusters or dimensions can be distinguished among consumers and products, based on the choices?
3. What are possible explanations for these patterns?
4. How can transaction data be used to address the marketing challenges in this field?

We will first discuss the conclusions and implications of the four studies, then point out the limitations of transaction data, and suggest avenues for further research.

6.2 Conclusions

Segmentation of arts consumers

In chapter two we addressed the question whether choice behavior in arts and entertainment exhibits any structure at all, given the diversity of tastes and the different need states consumers may have at different times. Secondly, as previous literature suggested that particular methods are more suitable than others in this field, but failed to specify which method is most appropriate, we made a case for one specific method.

We proposed latent class analysis as an appropriate method for segmenting a hedonic product and illustrated its application with library loan data (question 1). In spite of the potential diversity of tastes and different need states consumers may have at

particular moments, results showed a clear segmentation (question 2). However, some segments were found to be better separated than others, underscoring the need for a clustering technique incorporating classification uncertainty to address differences in need states (question 1).

Choice patterns in public libraries

In the sectors of public libraries and video rental stores, consumers are often able to access a large part of the available supply at one location close by. Unlike museums, there is rarely a need to travel across the country and compared to theaters or concert halls, the available supply is far less spread out in time. As a consequence, consumers are faced with a massive choice, with particularly fiction often just arranged by alphabetical order, rather than by the needs it may fulfill. In chapter three we argued for transaction data as a suitable source for inferring the consumer choice process. Such a model would help arranging the large stock to match the choice process (question 4). We identified two methodological issues in using such data: the size of choice options and how to distinguish between combinations of choices reflecting similar needs and reflecting variety seeking. We proposed a combination of latent class analysis and ultrametric trees to address these issues (question 1). The analyses reveal four segments with each a specific structure of (an appropriate part of) the collection (question 2). These results suggest that values and identification with particular settings play an important role in the choice for story based entertainment (question 3)

Choice patterns in the performing arts

Theaters and concert halls offer their supply in one location, but spread in time. As a result, arts marketers are pressed to continuously solicit customers for a stream of new, unknown products with fixed deadlines. Many arts marketers use cross-selling, such as direct mail or bundling of performances into subscription packages (question 4). For both forms knowledge of choice patterns is particularly important. With new products to be marketed for almost every evening, marketers must avoid customers to be inundated with direct mail. Thus, they can only approach a small selection of customers every time. With subscription packages, consumers will reject entire packages if they only like a few of the included performances; bundling would thus hinder rather than improve sales.

We reviewed recent developments in neurophysiology that indicate that some people are more auditory and others are more visually oriented (question 3). We argued that these individual differences might influence variety seeking in the performing arts as some performances are more auditory and others more visually stimulating. Results show that choice patterns in the performing arts do seem to be influenced by an auditory-visual dimension (question 2). Together with complexity, this dimension also was shown to have predictive validity over and above repeat purchases in predicting future choices.

Choice patterns in museum visiting

In the museum sector, supply is spread mostly geographically. Whilst museums try to encourage repeat visiting by putting on temporary exhibitions, it is common in museum visiting to seek variety by visiting different museums. We argued that this willingness to travel may also be used to compare use value of organizations (question 4). This is an important issue in public economics, where estimating the value of non-market goods is necessary to determine the appropriate level of government funding. Two methodological issues in using such data were pinpointed, such as the particular distribution of museums and inhabitants across a nation, and the potentially confounding role of multi-purpose visits. We proposed a mixture solution of a logit model to address these issues (question 1). Results revealed four segments that differ in their willingness to travel and in the ranking of the utility of museums (question 2). The interpretation of these segments suggests that mixture models may be a potentially fruitful way to account for the effect of multi-purpose visits. The results suggest that characteristics of both the museum and the environment influence the choice to visit a particular museum (question 3); segments differ in the role of the characteristics.

General conclusion

In the four studies we have given several answers to the four specific research questions:

1. *What are appropriate methods for analyzing these transaction data?*
   We identified several methodological issues, such as situational heterogeneity (chapter 2); the difficulty of distinguishing variety seeking from 'repeat' choices (chapter 3); or the issue of multi-purpose visits in comparing use value (chapter 5), and proposed particular solutions such as latent class analysis (chapter 2, 3), ultrametric trees (chapter 3) and a mixture solution of a logit model (chapter 5).
2. *What clusters or dimensions can be distinguished among consumers and products, based on the choices?*
   In each of the four studies, heterogeneity among consumers could be summarized into a limited set of segments (chapter 2, 3 and 5) or dimensions (chapter 4). These segments clearly differed in the type of products preferred. Chapter 3 showed that product spaces exhibit a particular hierarchical categorization, whereas chapter 4 showed that product categories in the performing arts can be positioned on a set of three scales in a two dimensional space.
3. *What are possible explanations for these patterns?*
   In particular, we proposed individual differences in sensory modality dominance in chapter 4 as the most likely explanation for the combinations of genres chosen by performing arts visitors. In addition, we discussed patterns found in other studies, pointing to the potential roles of complexity (chapter 2 and 4); of values and identification in story-based entertainment (chapter 3); and characteristics of both the organization and its environment in visiting behavior (chapter 5).

4. *How can transaction data be used to address some of the challenges mentioned above?*
   We suggested several applications for the use of transaction data. Applications presented here are customer segmentation (chapter 2); user-based structuring of collections (chapter 3); cross sell lead generation (chapter 4); and determining the use value of competing organizations (chapter 5).

Returning to the central research problem, we may, based on the four studies, conclude that:

1. While consumers are heterogeneous in their choice behavior, the heterogeneity in the transaction data can be summarized quite well into a limited number of segments (chapter 2, 3 and 5) or dimensions (chapter 4).
2. Although uniqueness is a key characteristic of cultural products (Hirschman 1983), some products are clearly considered more similar than others. Insight into which products are similar to which may aid in a number of marketing activities such as shelf management, cross selling, promotion, et cetera.

In sum, the results of the four studies show that consumer choice behavior in arts and entertainment, as registered in transaction data, exhibits specific patterns. These patterns may be used in various applications to meet challenges that are particular to this market.

6.3 Implications

Implications for academic research

These results hold a number of implications for future marketing and consumer behavior research into arts and entertainment:

- Modeling applications constitute a large part of marketing and consumer behavior research into arts and entertainment; the introduction mentioned many examples. Most of these studies do not incorporate heterogeneity in consumers or products. For instance, for movies, the relationship between critics and success (Eliashberg and Shugan 1997) or the timing when to enter a foreign market (Elberse and Eliashberg 2003) may well differ per type of movie. Sometimes, general notions of genre are included in models (e.g., Holbrook 1999; Reddy, Swaminathan, and Motley 1998; Weinberg 1986), but these categorizations are often based only on broad industry conventions, rather than on particular insight into customer based market structures. Only a few notable exceptions specifically include segmentation, such as Jedidi, Krider, and Weinberg (1998), or Moe and Fader (2001). Our results suggest it is important to do so.
- The specific structure of choice behavior of arts and entertainment products does not always follow conventional (expert) classifications (e.g., chapter 3). In many modeling applications, product categories, such as genres, are a common variable. Our

results, notably chapter 3, suggest that it is important to carefully consider whether such a variable reflects a categorization that is relevant in consumer choice behavior.

- Complexity and/or the idea of a Wundt curve or optimal stimulation point has often been found to be an important dimension in aesthetic research (e.g., Anand and Holbrook 1986; Holbrook 1980; Kellaris 1992). Our results show that complexity, at both ends of the dimension, is more varied than commonly thought. Chapter 3, particularly the sharp distinction between American translated romantic fiction and Dutch romantic fiction showed that there are distinct categories of low complex products. Chapter 4 showed that in multi-sensory product categories, a distinction should be made between auditory complexity and visual complexity. Future research involving complexity should therefore consider whether it can be regarded as a unidimensional construct or whether there are different forms of complexity and simplicity in the situation under scrutiny.
- Other than complexity, dimensions or choice criteria seem very case or situation specific, but still very relevant (e.g., the auditory – visual dimension in chapter 4, or the location: within versus outside the Randstad in chapter 5). This implies that apart from complexity, any further study will have to investigate the choice patterns first for the particular research object.
- Finally, no marketing or consumer behavior research into or related to arts and entertainment has made use of transaction data. The four studies in this thesis illustrate that these can be an important source of information.

While this research was specifically aimed at addressing issues in arts and entertainment, two other implications extend beyond this field:

- As discussed in chapter 4, the indication that individual differences in sensory modality dominance influences consumer behavior, potentially has major implications for a range of areas, such as advertising, sensory appreciation of hedonic goods or packaging, sensory satiety and variety seeking, or the susceptibility to music in mood and affect inducement. However, additional research is needed to more fully estimate the implications of these individual differences.
- The issue of a customer based shelf lay-out, addressed in chapter 3, is not just confined to public libraries, but is a broader issue in retailing generally. In fact, market structure analysis is gaining renewed interest in retailing as a tool for better shelf management (Bucklin and Gupta 1999). The advantages of the methodology developed in our research are that it is able to categorize large ranges of products while accounting for heterogeneity and avoiding a priori aggregation, yet it is simple and easy to apply. As such, it may perhaps also benefit similar issues in retailing.

Managerial implications

The aim of this research was to help arts marketers in addressing the challenges arising from the continuous, large supply of products. Given the managerial focus of the aim, the implications for marketers in this field should be evident. On a general note, the results show that there are specific patterns and segments in each discipline, offering possibilities to target and serve customers more tailor-made; a number of which have been illustrated.

The particular point we want to make here, however, concerns the care organizations currently take versus should take in logging and storing information. Over the course of this research many arts organizations have enthusiastically participated and provided any possible data set. However, many anomalies have been identified in checking the data before analyses. Almost all of these issues could be related to errors or carelessness in entering or storing transaction data. Also, not all suppliers of transaction data systems have realized the importance of transaction data for marketing purposes and suited their applications for easy analyses. While such issues have been addressed before further analyses, they have taken a considerable amount of time of both the researcher and organization, and potentially limit the possibilities for future. As far as limited financial resources are withholding arts organizations from professional data warehousing, we conjecture that its importance would warrant further consultation with funding bodies.

If anything, the major implication is that transaction data hold vital marketing information and require fitting care and attention.

6.4 Limitations of transaction data and potential solutions

Key message of this research is that transaction data are a valuable source for analyzing consumer choice behavior. Specific advantages mentioned in the introduction were the possibility to account for heterogeneity, the veracity of results to real life over experiments, and the accuracy of transaction data over self report measures in surveys. On the other hand, the marketing literature notes several general limitations in the use of individually recorded purchases, such as scanner data, (e.g., Leeflang and Wittink 2000; Wedel, Kamakura, and Bockenholt 2000):

- For relatively infrequently purchased goods, household data may not be dense enough. In the context of the present research, this issue, for instance, plays a role in chapter 3 where individual fiction titles were clustered based on the joint probability of being borrowed. When items are borrowed very infrequently, combinations are more coincidental than reflecting similarity. This problem has also been noted in the related context of collaborative filtering (e.g., Ansari, Essegaier, and Kohli 2000). This is particularly an issue when, as in chapter 3, techniques are used that do not report classification uncertainty. Note that in chapter 3 this was solved (crudely) by only using titles with a minimum number of transactions.
- There is uncertainty about the representativeness of scanner data as not all retail outlets have scanners. The issue of the representativeness of data is also relevant in

our context. In chapter 5, we already remarked that in estimating use value, we have no data on tourists visiting museums or visitors with no Museum Card; neither do we have data on visits to smaller museums. Although the main aim of the research was to show how competing cultural organizations may be compared, the results may therefore not be taken as a final assessment of relative use value. Similarly, the data from the Amsterdam Central Box Office in chapter 4 only constitutes a particular part of the market for performing arts in Amsterdam. It does not constitute all sales of subscription packages of the participating venues; neither does it include any single ticket sales. While we believe that it does not influence the results, care needs to be taken when extending research to constructs such as market share or trends.

- The lack of information on the context of the choice. The data only observe a choice at a particular moment and in situation, but often do not register the nature of that situation. However, much of the registered choice may depend on such situational factors. In this research, we came across this issue in particular in two chapters. In chapter 2, we investigated whether one can distinguish segments of library users and mentioned situational heterogeneity as a particular reason why this may not be straightforward. To account for the resulting classification uncertainty, we used a latent class analysis. Results showed that indeed some segments exhibit more classification uncertainty than others. In chapter 5, the issue of multi-purpose visits and the lack of information on the role of (temporary) exhibitions may be seen in this light. The choice for a museum made during a rainy day on a camping trip nearby has a different motivation and value than the choice for a visit made from home out of sheer interest for the collection on display. Here, we suggested a mixture model to account for such heterogeneity. While these methodological solutions seem a potential solution to account for situational heterogeneity, the issue remains. For instance, without a follow-up survey, it is impossible to determine whether the mixture solution has adequately addressed the issue of multi-purpose visits. Furthermore, the consumption of arts and entertainment is often a social process, the outcome of which may represent a compromise with the guests that have accompanied the buyer. In most cases, neither the composition nor the process of compromises leading up to the actual process is known. Although it may also have influenced choice behavior in chapter 4, for instance in the kind of company in which the performances are to be attended, there is it all the more strengthening that an auditory-visual dimension was uncovered, in spite of such situational factors.

In addition to these limitations cited in the literature on the use of scanner data, we also would like to recall some of the other caveats mentioned in the introduction:

- The value of transaction data is strongly dependent on the accuracy of the registration process. For instance, most box office systems do not use a customer card, but require staff to ask for a name and address. When such client data are not registered carefully, the system may fail to recognize a returning client. On the other hand, joint use of a library card may wrongly indicate a heavy user with broad interests.
- Transaction data contain no information on satisfaction with the choice. Past choices do not necessarily imply that the customer actually liked the products; some may actually have been an erroneous, regretted choice. This is particularly true in arts and entertainment, where there is often little possibility for any "try before you buy".
- Choice data hold little information on customers themselves (i.e. demographic or socio-economic variables) or on their choice process. While some information may be inferred from choices, care has to be taken in the extent to which this is possible.
- While analyses of transaction data suggest that choices were made within the particular supply of one organization, the actual choice may have been between products of different providers. For instance, rather than a trade-off between two ballet performances, the real choice may have been between a ballet performance and a movie. As most transaction systems in the cultural sector are not linked, it is difficult to assess choices in a broader context.
- In this research we have only looked at choice behavior within a given supply. We do not know whether the results reflect independent preferences or in how far the choices are influenced by competitive behavior of producers and suppliers. Specific strategies (e.g., in what category a product is positioned, or pricing decisions) or alliances (e.g., between producer and intermediaries) may influence choice behavior. While the markets that are studied here seem to be primarily buyers markets, with a generally abundant supply, rather than sellers markets, we cannot rule out that the choice behavior studied here is to some extent dependent on structures and strategies on the supply side.

Although in our opinion these limitations have not influenced the core of our studies, it is interesting to note how these limitations may be addressed when using transaction data in future research or applications in arts marketing practice. Several authors have proposed combinations with other data sources to overcome the issues involved in using scanner data (e.g., Leeflang and Wittink 2000; Russell and Kamakura 1994; Swait and Andrews 2003; Verhoef et al. 2003; Wedel, Kamakura, and Bockenholt 2000). Some examples of such solutions proposed in the literature, together with their analogies to the use of transaction data in arts and entertainment:

- Combinations of transaction data of different retail chains. Here, this may imply several options: competing arts organizations sharing data, such as multiple performing arts venues in the same city (e.g., Amsterdam); complementary arts organizations in the same area sharing transaction data, such as a local theater sharing data with a local public library; or arts organizations and commercial organizations sharing data, such as a local public library and local bookstores sharing data to get a more complete picture of book acquisitions. Linking data from different sources can be cumbersome as different transaction systems mean that customers are registered under different customer ID's. However, it would provide arts managers with a more complete picture of what probably is a more realistic definition of their market. The joint use of a single customer card may help in overcoming practical burdens.
- Combinations with zip code data. A number of firms, such as Claritas and Wegener Press (The Netherlands), collect data on inhabitants of all zip code areas, either by surveys or by combining multiple sources. Relating these socio-demographic and lifestyle data to customer details may give a better insight in whom arts organizations are serving. While the costs of such data services have been discouraging for non-profit organizations, a recent three year pilot in Rotterdam has shown promising results and several major arts organizations are now considering its addition to transaction data systems; both for segmenting current customers as well as segmenting current non-users[16].
- Combinations with surveys. Sampling some of the customers in a transaction database for a survey may help in getting more background information and/or explanatory variables to understand choice behavior. We are not aware of particular applications in arts and entertainment of surveys to enrich transaction data. However, enrollment (e.g., Museum Card) and ordering forms (e.g., ordering of subscriptions) are occasionally used to collect extra information, not strictly needed for processing the orders. This may include questions on basic demographics (e.g., date of birth) or on information sources used in the choice process (e.g., "How did you hear about this new service X?").
- Combinations with clickstream data. A number of arts organizations have started to put transaction facilities on-line. For instance, public libraries not only offer borrowers the opportunity to search their catalogues from home through the internet, but also allow for on-line reservations, extensions of borrowing periods, or the use of information databases (e.g., in The Netherlands: Al@din). Similarly, performing arts venues offer on-line ticketing facilities. Together with extensive product information that has already been on-line for a longer time, a combined dataset would give insight into a broader range of choice behavior as well as include search and information seeking behavior. On the other hand, it would potentially offer customers on-line

[16] Based on personal communications with a number of arts organizations.

personalized information based on stated preferences, search behavior and past transactions. Note that on-line bookstores such as Amazon.com have already advanced in this direction.

- Combination of household and store level data. The Dutch Association of Theater and Concert Hall Directors has been collecting extensive management information on its participating venues. Data include financial indicators, sales data, environment characteristics and details on facilities and management structure. Not only does this help in evaluating the representativeness of individual transaction data (e.g., how representative is the Amsterdam Box Office data set in chapter 4 in capturing market share), but also this may explain differences when comparing transaction data from multiple theaters, for instance competing venues in Amsterdam. Similarly, if the Dutch Museum Association had been collecting such data on its members, this may have helped in explaining differences in museum attractiveness found in chapter 5.

6.5 Directions for further research

In addition to the suggestions for improvement mentioned in the previous paragraph, as well as the refinements mentioned in the conclusions of the four studies, we see a number of directions for further research. Here, we discuss three such directions: extending the theoretical contributions; extending the modeling; and extending the role of transaction data to other areas.

First, further research may build on the *theoretical* findings of this research. The results from chapter 4 – the main theoretical contribution of this research – indicate that individual differences in sensory modality dominance may influence consumer behavior. Given the major implications these individual differences potentially have for both advertising and preferences for sensory (hedonic) goods, we belief more research is warranted. Apart from additional (experimental) research already underway to more formally establish the link between individual differences in sensory modality dominance and choice, further research is needed to estimate the actual implications for the processing of advertising. Also, examining the influence on preferences in other hedonic categories than performing arts may contribute to a better understanding of the role such individual differences have on consumer choice behavior.

Second, further research may build on *the models* presented in this research. Here, the transaction data have been used for descriptive (chapter 2, 3 and 5), and in part predictive (chapter 4) models of consumer choice behavior. As mentioned in the review of the marketing and consumer behavior literature in the introduction of this thesis, there are a number of advanced predictive and normative modeling applications into arts and entertainment; so far, these have relied on (aggregated) sales data. While some heterogeneity may be inferred from differences in sales data (e.g., Moe and Fader 2001), the disaggregated level of transaction data would allow for improved or more sophisticated models that, among others, more easily account for heterogeneity. One

particular example of such research underway builds on the library data of chapter 3 and integrates the topics of chapters 2, 3 and 5. Using heterogeneity in travel distance (see chapter 5) and consequently visiting incidence and timing as well as differences in user types (see chapter 2), we expect to be able to predict visiting levels at a public library for a given moment. Predicting such customer demand at particular moments helps in planning front office staffing levels. This model will then be extended to a normative model for assortment size and depth. While there are several models for optimal assortment composition (e.g., Boatwright and Nunes 2001), these are based on fast moving consumer goods. Here, previously borrowed goods are *returned* to the assortment and the consumer will want a new, *different* item. For this different item, there is a choice from 10,000s of different titles. However, these titles differ in their proximity to genre of interest (see chapter 3). The question is what constitutes an optimal assortment, e.g., the chance that a given customer at a given time can leave the facility with its usual number of items and all within the range of interest, given his or her visiting incidence and timing, preferred genres, return rates of books in those genres, life time of titles in those genres (how often are new titles added), et cetera. Apart from integrating the various parts of this thesis, it would address an important need in library management as well as extend insight into assortment management for pure hedonic goods instead of for utilitarian and/or low(er) involvement goods with greater inertia.

Third, further research may expand on the potential role of transaction data to *other areas*. In chapter 5 we highlighted one particular variable in transaction data: travel time – as registered indirectly in the zip code of the customer's address. We showed how this information may aid in determining the use value of cultural goods, an important issue in public economics. In chapter 5, we made suggestions for refinements as directions for further research. Here, we would like to point to the potential contribution this variable in transaction data may have for research in other areas. For instance, over the years, there has been a steady interest in city management in the role of cultural amenities, under changing names such as 'economic impact studies' in the 1980s (e.g., Chartrand 1984; National Endowment for the Arts 1981; Van Puffelen 1987), the rise of 'city marketing' in the 1990s (e.g., Kearns and Philo 1993; Ward 1998), and the concept of 'creative cities' as the most recent guise (e.g., Florida 2002; Landry 2000). Behavioral data on which cultural amenities serve customers from where may benefit town planning. Additional analyses of the dataset of chapter 5 suggest that there are distinct types of museums, differing in size of region they serve, type of region they are located in (urban versus rural) and whether the proximity to other museums leads to an agglomeration effect (strengthen attractiveness) or leads to competition. Such information helps city planners to understand the role of museums as cultural amenity for inhabitants and/or tourists.

Another example is the potential role in research into distribution. For instance, in planning tours across the country, theater companies and music ensembles have to find a balance between the willingness to travel of the two sides: customers versus suppliers.

While an interesting context in itself from a public economics point of view, the unique aspect of this issue from a distribution perspective is that with theater companies and music ensembles, there is only one “item” making consecutive visits. Contrary, in the distribution of movies, many copies of a unique product may be put on display simultaneously at many locations (e.g., Swami, Eliashberg, and Weinberg 1999). While modeling total sales data of performances at the various venues may already provide some insight into the effects of, for instance, day of the week or time of the year, transaction data allow for the inclusion of individual data, such as the willingness to travel (estimating more specifically the service area and alternative locations) and competition with other staged events (based on patterns in choice data). Such research is currently underway, in cooperation with the Association of Theater and Concert Hall Directors, the ten largest theaters in The Netherlands and Toneelgroep Amsterdam, the largest subsidized theater company in this country.

The main message from this research is that transaction data are a new, interesting source of marketing information about consumer choice behavior in arts and entertainment. Most organizations in this sector lack the skills and knowledge necessary to put such data to use; a situation that, surprisingly, is not dissimilar to commercial organizations (e.g., Bucklin and Gupta 1999; Verhoef, Spring, Hoekstra, and Leeflang 2003). If anything, this research may be seen as work in progress: we trust to have illustrated some of its potential and hope this is just the start of many other relevant applications to serve arts marketers.

7. Nederlandse samenvatting

Marktstructuren in kunst en entertainment

Sinds Kotler's (1975) pleidooi om ook bij non-profit organisaties marketing toe te passen, is er in de marketing en consumentengedrag literatuur opvallend veel aandacht voor kunst en entertainment. Niet alleen, zoals Kassarjian (1980) stelt, omdat "kunst en entertainment nu eenmaal meer prestigieuze voorbeelden zijn dan doperwten", maar vooral omdat kunst en entertainment een aantal specifieke, interessante kenmerken hebben die marketing en consumentengedrag in deze sector anders maken. Eén zo'n kenmerk is dat consumenten steeds een ander product willen; het opnieuw kopen van dezelfde cd of hetzelfde boek komt relatief weinig voor. Het gevolg is dat er een (zeer) groot, en/of constant vernieuwend aanbod is om aan de wens naar afwisseling te voldoen. Zowel voor marketeers als consumenten maakt dat het niet gemakkelijk. Consumenten kunnen zich niet altijd goed oriënteren in het grote aanbod of gemakkelijk een keuze maken. Marketeers moeten steeds snel klanten weten te vinden voor weer nieuwe producten, voordat deze van de markt verdwijnen.

Omdat bestaande klanten de beste doelgroep zijn voor nieuwe producten (Kamakura, Ramaswami, and Srivastava 1991), proberen marketeers vaak meerdere producten tegelijkertijd te verkopen door producten te bundelen (bijvoorbeeld abonnementen) of door bestaande klanten met direct mail te benaderen. Ook het thematisch presenteren van het aanbod kan helpen. Om dit soort technieken effectief in te kunnen zetten is het zeer belangrijk inzicht te hebben in de marktstructuur: welke klantsegmenten zijn er en welke segmenten zijn geïnteresseerd in welke producten?[17]. Bijvoorbeeld, veel theaters en concertzalen hebben bijna elke avond wel weer een nieuwe uitvoering, waarvoor klanten moeten worden geworven. Marketeers kunnen echter niet dagelijks hun klantenbestand overladen met direct mail; zij kunnen elke keer maar een zeer beperkte groep aanschrijven. Deze keuze zal dan wel zeer treffend moeten zijn. Een typische vraag zou dan kunnen zijn: "Wie kan het beste worden benaderd voor een dansvoorstelling?" Een ander voorbeeld is het samenstellen van abonnementen. Abonnementen verkopen alleen goed wanneer de verschillende voorstellingen in een pakket voor een zelfde groep mensen aantrekkelijk zijn. Wanneer iedereen maar één voorstelling in een pakket aantrekkelijk vindt en de overige niet, zullen er nauwelijks abonnementen worden verkocht.

[17] De term 'marktstructuur' wordt in dit proefschrift specifiek gebruikt in relatie tot een groep methoden binnen marketing om consumenten en producten te segmenteren of op dimensies te plaatsen (vgl. Day, Shocker, and Srivastava 1979). Binnen Economie heeft "marktstructuur" een bredere betekenis.

Sinds kort hebben veel culturele instellingen transactiesystemen die niet alleen verkopen registreren, maar deze ook koppelen aan klantgegevens. Zo wordt het mogelijk om het keuzegedrag van consumenten op individueel niveau te volgen. Dergelijke data zouden zeer geschikt zijn om te onderzoeken of er marktstructuren zijn af te leiden uit het daadwerkelijke keuzegedrag. Centrale vraag in dit onderzoek is:

Wat is uit transactie gegevens af te leiden over marktstructuren in kunst en entertainment?

Momenteel zijn data beschikbaar over leners van bibliotheek boeken, over Museumkaart houders en over klanten van een aantal theaters en concertzalen. In dit onderzoek komen bij het analyseren van deze data steeds één of meer van de volgende vier vragen aan bod:

1. Welke methode is het meest geschikt voor het analyseren van deze data?
2. Wat voor clusters of dimensies van klanten en/of producten zijn te onderscheiden?
3. Zijn deze structuren te verklaren?
4. Hoe kan kennis van deze structuren marketeers van culturele instellingen helpen?

Hoofdstuk 2. Segmentatie van kunstconsumenten

In de eerste, verkennende studie wordt aan de hand van een bestand van uitleningen binnen één jaar door 7.359 klanten van een bibliotheek gekeken of er sprake is van een zeer basale vorm van structuur: duidelijke, afgebakende groepen leners die verschillen in de genres die zij lenen. Wij beargumenteren dat een segmentatie methode die rekening houdt met onzekerheden in de toewijzing van mensen aan segmenten, zoals een latente klasse analyse, het meest geschikt zou zijn. Resultaten van een latente klasse analyse laten zien dat er acht verschillende typen leners te onderscheiden zijn. Deze verschillen niet alleen in de geleende genres, maar ook naar leeftijd en mate van bibliotheekgebruik.

Hoofdstuk 3. Marktstructuren in openbare bibliotheken: *een consumentgerichte indeling van bibliotheekcollecties*

In de tweede studie wordt aan de hand van een bestand van uitleningen van bibliotheek boeken door 13.142 klanten over meerdere jaren gekeken naar de combinaties van fictie titels die mensen lenen over een periode. Dit zou bibliotheken kunnen helpen om het grote aanbod aan boeken naar thema te presenteren in plaats van, zoals nu gebruikelijk, op alfabet. Bestaande analyse methoden zijn niet zo maar geschikt om uit dergelijke grote aantallen producten een structuur af te leiden, zeker als daarbij rekening moet worden gehouden met het bestaan van verschillende segmenten. Wij beargumenteren dat een combinatie van ultrametrische boomstructuren en latente klasse analyse hiervoor wel geschikt zou zijn. De resultaten laten vier segmenten leners van fictie zien die elk een specifieke categorisering hebben van (hun deel van) het aanbod. Opvallend is onder meer het grote verschil tussen (vertaalde) Amerikaanse romantische fictie en romantische fictie

van Nederlandse auteurs. Dit verschil en andere specifieke categorieën suggereren dat waarden en normen in verhalen als ook de setting van het verhaal een belangrijke rol spelen in het keuzegedrag.

Hoofdstuk 4. Marktstructuren in de uitvoerende kunsten: *individuele verschillen in dominantie van zintuigen en product keuze.*

In de derde studie wordt gekeken naar de gekozen combinaties van genres in de podiumkunsten. We bespreken recente ontwikkelingen in de neurofysiologie die er op wijzen dat sommige mensen auditiever zijn ingesteld en andere mensen visueler zijn ingesteld. Dit zou van invloed kunnen zijn op de voorkeuren voor deze genres, omdat deze in wisselende mate meer auditief (bijvoorbeeld kamermuziek) of meer visueel (bijvoorbeeld moderne dans) zijn. Een analyse van combinaties van gekozen genres van 12.863 klanten van het Amsterdams Uitburo (AUB) over een periode van drie jaar laat zien dat binnen complexe genres inderdaad een auditief-visuele dimensie is terug te vinden. De 744 verschillende abonnementen waaruit klanten konden kiezen zijn tevens uitgebreid beoordeeld door vier experts op zestien mogelijke dimensies. Deze beoordeling bevestigt de auditief-visuele dimensie. Deze auditief-visuele en complexiteit dimensies blijken ook voor een deel de keuzes voor een nieuw seizoen te kunnen voorspellen.

Hoofdstuk 5. Marktstructuren in museumbezoek: *het vergelijken van de waarde van concurrerende culturele instellingen op basis van reistijd*

In de vierde en laatste studie wordt gekeken naar museumbezoek. Om hierin afwisseling te vinden is het bezoeken van verschillende musea heel gewoon. Dit betekent echter wel dat klanten meer moeten reizen. Aan de hand van dit reisgedrag kan worden gekeken welk museum aantrekkelijker is. Hoewel het voor de hand ligt dat de grote musea veel mensen trekken en van ver, terwijl de kleinere musea minder mensen zullen trekken en een meer regionale aantrekkingskracht hebben, laten we zien dat een rangorde naar aantal bezoekers een andere is dan een rangorde naar gemiddelde reistijd. Dit komt door de ongelijke verdeling van mensen en musea over Nederland. Musea in de grote steden kunnen makkelijker scoren op aantal bezoekers en musea in de periferie kunnen beter scoren op gemiddelde reistijd. We beargumenteren dat site choice modellen daarom beter geschikt zijn. Een tweede punt is echter dat sommige groepen mensen museumbezoek vooral zullen combineren met, bijvoorbeeld, een vakantie of dagje winkelen. Hierdoor zou reisgedrag niet zo maar vergelijkbaar worden. We stellen voor om daarom een mengsel variant van een site choice model te gebruiken. De resultaten laten inderdaad zien dat er vier segmenten zijn met elk een eigen rangorde van musea. Deze segmenten zijn op dezelfde manier verspreid over Nederland. De hoogscorende musea van de vier groepen verschillen echter in het type museum en het type omgeving (beter te combineren met winkelen of met recreatie).

Hoofdstuk 6. Conclusies en discussie

In het laatste hoofdstuk stellen we vast dat transactie data duidelijke structuren laten zien in het daadwerkelijke keuzegedrag van consumenten van kunst en entertainment. We geven, waar mogelijk, verklaringen voor deze structuren en geven aan hoe deze kennis marketeers kan helpen. Hoewel transactie data ook beperkingen hebben, zijn deze een rijke bron van marketing informatie. We pleiten er dan ook voor dat culturele organisaties meer aandacht besteden aan het goed opslaan, verwerken en analyseren van deze gegevens. We sluiten af met een aantal concrete mogelijkheden voor vervolgstudies die marketeers van culturele instellingen verder kunnen helpen, waaronder de volgende voorbeelden van reeds opgestarte projecten:

- *Optimaliseren reisgedrag:* Wat is, gezien de individuele bezoekpatronen bij verschillende soorten theaters, de meest optimale tourneeplanning van een toneelgezelschap?
- *Optimaliseren personeelsinzet:* Is het mogelijk om, op basis van de verdeling van uitgeleende boeken, het aantal klanten te voorspellen dat op een bepaalde dag de bibliotheek zal bezoeken, zodat personeelsbezetting beter ingepland kan worden?
- *Optimaliseren assortiment:* Hoeveel boeken van welk genre moet een bibliotheek minimaal hebben om te zorgen dat klanten elke keer genoeg keuze hebben?

References

Adeloye, Anthony (2003), "How to Market Yourself and Your Library Organization: A Solo Librarian's Guide," *The Bottom Line*, 16 (1), 15-8.

Alberini, Anna, Patrizia Riganti, and Alberto Longo (2003), "Can People Value the Aesthetic and Use Services of Urban Sites? Evidence From a Survey of Belfast Residents," *Journal of Cultural Economics*, 27 (3 - 4), 193-213.

Anand, P. and Morris B. Holbrook (1986), "Chasing the Wundt Curve - An Adventure in Consumer Aesthetics," in *Advances in Consumer Research*, Richard Lutz, ed. Provo (UT): Association for Consumer Research, 655-7.

Andreasen, Alan R. (1992), "Expanding the Audience for the Performing Arts," Washington, DC: Seven Locks Press.

Andreasen, Alan R. and Russell W. Belk (1980), "Predictors of Attendance at the Performing Arts," *Journal of Consumer Research*, 7 (2), 112-20.

Ansari, Asim, Skander Essegaier, and Rajeev Kohli (2000), "Internet Recommendation Systems," *Journal of Marketing Research*, 37 (Aug), 363-75.

Ansari, Asim, S. Siddarth, and Charles B. Weinberg (1996), "Pricing a Bundle of Products or Services: The Case of Nonprofits," *Journal of Marketing Research*, 33 (Feb), 86-93.

Astous, Alain d. and Nadia Touil (1999), "Consumer Evaluations of Movies on the Basis of Critics' Judgments," *Psychology & Marketing*, 16 (8), 677-94.

Baharloo, S., S. K. Service, N. Risch, J. Gitschier, and N. B. Freimer (2000), "Familial Aggregation of Absolute Pitch," *American Journal of Human Genetics*, 67 (3), 755-8.

Baldwin, Lori and Richard W. Mizerski (1985), "An Experimental Investigation Concerning the Comparative Influence of MTV and Radio on Consumer Market Responses to New Music," in *Advances in Consumer Research*, Elizabeth C. Hirschman and Morris B. Holbrook, eds. Provo (UT): Association for Consumer Research, 476-81.

Bamossy, Gary J. (2005), "Star Gazing: The Mythology and Commodification of Vincent Van Gogh," in *Inside Consumption: Frontiers of Research on Consumer Motives, Goals, and Desires*, David Mick and S. Ratneshwar, eds. London/New York: Routledge.

Bandler, Richard and John Grinder (1979), *Frogs into Princes: Neuro Linguistic Programming*. Moab (UT): Real People Press.

Basil, Michael D. (2001), "The Film Audience: Theater Versus Video Consumers," in *Advances in Consumer Research*, Mary C. Gilly and Joan Meyers-Levi, eds. Provo (UT): Association for Consumer Research, 349-52.

Basu, Amiya, Tridib Mazumdar, and S. P. Raj (2003), "Indirect Network Externality Effects on Product Attributes," *Marketing Science*, 22 (2), 209-21.

Basuroy, Suman, Subimal Chatterjee, and S. A. Ravid (2003), "How Critical Are Critical Reviews? The Box Office Effects of Film Critics, Star Power, and Budgets," *Journal of Marketing*, 67 (4), 103-17.

Bates, Constance S. (1983), "An Unexplored International Market - The Art Market," *Journal of the Academy of Marketing Science*, 11 (3), 240-9.

Baumgartner, Hans (1992), "Remembrance of Things Past - Music, Autobiographical Memory, and Emotion," in *Advances in Consumer Research*, John F. Sherry Jr. and Brian Sternthal, eds. Provo (UT): Association for Consumer Research, 613-20.

Belk, Russell W. and Alan R. Andreasen (1980), "De Gustibus Non Est Disputandem: A Study of the Potential for Broadening the Appeal of Performing Arts," in *Advances in Consumer Research*, J. C. Olson, ed. Ann Arbor: Association for Consumer Research, 109-13.

Ben-Akiva, M. and S. R. Lerman (1985), *Discrete Choice Analysis Theory; An Application to Travel Demand*. Cambridge (MA): MIT Press.

Berlyne, D. E. (1960), *Conflict, Arousal, and Curiosity*. New York, NY [etc.]: McGraw-Hill.

Bhattacharya, C. B. (1998), "When Customers Are Members: Customer Retention in Paid Membership Contexts," *Journal of the Academy of Marketing Science*, 26 (1), 31.

Bhattacharya, C. B., Hayagreeva Rao, and Mary A. Glynn (1995), "Understanding the Bond of Identification: An Investigation of Its Correlates Among Art Museum Members," *Journal of Marketing*, 59 (4), 46-57.

Blair, M. E. and Mark N. Hatala (1992), "The Use of Rap Music in Childrens Advertising," in *Advances in Consumer Research*, John F. Sherry Jr. and Brian Sternthal, eds. Provo (UT): Association for Consumer Research, 719-24.

Bloch, Peter H., Frédéric F. Brunel, and Todd J. Arnold (2003), "Individual Differences in the Centrality of Visual Product Aesthetics: Concept and Measurement," *Journal of Consumer Research*, 29 (4), 551-65.

Boatwright, Peter and Joseph C. Nunes (2001), "Reducing Assortment: An Attribute-Based Approach," *Journal of Marketing*, 65 (3), 50-63.

Bozdogan, H. (1987), "Model Selection and Akaike's Information Criterion (AIC): The General Theory and Its Analytical Extensions," *Psychometrika*, 52 345-70.

Brodie, Roderick J. and Peter J. Danaher (2000), "Building Models for Marketing Decisions:: Improving Empirical Procedures," *International Journal of Research in Marketing*, 17 (2-3), 135-9.

Brown, Stephen, Robert V. Kozinets, and John F. Sherry Jr. (2003), "Teaching Old Brands New Tricks: Retro Branding and the Revival of Brand Meaning," *Journal of Marketing*, 67 (3), 19-33.

Bruner, Gordon C. I. (1990), "Music, Mood, and Marketing," *Journal of Marketing*, 54 (4), 94-104.

Bucklin, Randolph E. and Sunil Gupta (1999), "Commercial Use of UPC Scanner Data: Industry and Academic Perspectives," *Marketing Science*, 18 (3on Managerial Decision Making), 247-73.

Caldwell, Clare and Sally A. Hibbert (2002), "The Influence of Music Tempo and Musical Preference on Restaurant Patrons' Behavior," *Psychology & Marketing*, 19 (11), 895-917.

Carlyle, Allyson (1999), "User Categorisation of Works: Toward Improved Organisation of Online Catalogue Displays," *Journal of documentation : devoted to the recording, organization and dissemination of specialized knowledge*, 184-208.

Chartrand, Harry (1984), *An Economic Impact Assessment of the Canadian Fine Arts*. Ottawa, Ontario: Canada Council, Research and Evaluation Section.

Collins, M. A. and K. Chandler (1997), "Use of Public Libraries by Households in the United States: 1996," Washington: National Center for Education Statistics.

Combes, Emma, Sally A. Hibbert, Gillian Hogg, and Richard Varey (2001), "Consuming Identity: The Case of Scotland," in *Advances in Consumer Research*, Mary C. Gilly and Joan Meyers-Levi, eds. Provo (UT): Association for Consumer Research, 328-33.

Cooke, Alan D. J., Harish Sujan, Mita Sujan, and Barton A. Weitz (2002), "Marketing the Unfamiliar: The Role of Context and Item-Specific Information in Electronic Agent Recommendations," *Journal of Marketing Research*, 39 (Nov), 488-97.

Coombs, Clyde H. (1964), *A Theory of Data*. New York: Wiley.

Cooper-Martin, Elizabeth (1992), "Consumers and Movies - Information-Sources for Experimental Products," in *Advances in Consumer Research*, John F. Sherry Jr. and Brian Sternthal, eds. Provo (UT): Association for Consumer Research, 756-61.

Corning, Jonathan and Armando Levy (2002), "Demand for Live Theater With Market Segmentation and Seasonality," *Journal of Cultural Economics*, 26 (3), 217-35.

Corter, James E. (1996), *Tree Models of Similarity and Association*. Thousand Oaks, CA [etc.]: Sage Publications.

Cramer, J. S. (2003), *Logit Models From Economics and Other Fields*. Cambridge: Cambridge University Press.

Csikszentmihalyi, Mihaly (1991), *Flow: The Psychology of Optimal Experience*. New York: HarperPerennial.

Csikszentmihalyi, Mihaly and Isabella S. Csikszentmihalyi (1988), *Optimal Experience: Psychological Studies of Flow in Consciousness*. Cambridge: Cambridge University Press.

Cuadrado, Manuel and Marta Frasquet (1999), "Segmentation of Cinema Audiences: An Exploratory Study Applied to Young Consumers," *Journal of Cultural Economics*, 23 (4), 257-67.

Currim, Imran S., Charles B. Weinberg, and Dick R. Wittink (1981), "Design of Subscription Programs for a Performing Arts Series," *Journal of Consumer Research*, 8 (June), 67-75.

Day, George S., Allan D. Shocker, and Rajendra K. Srivastava (1979), "Customer-Oriented Approaches to Identifying Product-Markets," *Journal of Marketing*, 43 (4), 8-19.

De Ruyter, Ko, Martin Wetzels, Jos Lemmink, and Jan Mattsson (1997), "The Dynamics of the Service Delivery Process: A Value-Based Approach," *International Journal of Research in Marketing*, 14 (3), 231-43.

Derbaix, Christian and Lennart Sjoberg (1994), "Movie Stars in Space: A Comparison of Preference and Similarity Judgments," *International Journal of Research in Marketing*, 11 (3), 261-74.

Dhar, Ravi and Itamar Simonson (1999), "Making Complementary Choices in Consumption Episodes: Highlighting Versus Balancing," *Journal of Marketing Research*, 36 (Feb), 29-44.

Drayna, Dennis, A. Manichaikul, Marlies de Lange, H. Snieder, and T. Spector (2001), "Genetic Correlates of Musical Pitch Recognition in Humans," *Science*, 291 (5510), 1969-72.

Dubé, Laurette, Jean-Charles Chebat, and S. Morin (1995), "The Effects of Background Music on Consumers Desire to Affiliate in Buyer-Seller Interactions," *Psychology & Marketing*, 12 (4), 305-19.

Elberse, Anita and Jehoshua Eliashberg (2003), "Demand and Supply Dynamics for Sequentially Released Products in International Markets: The Case of Motion Pictures," *Marketing Science*, 22 (3), 329-54.

Eliashberg, Jehoshua, Jedid-Jah Jonker, Mohanbir S. Sawhney, and Berend Wierenga (2000), "MOVIEMOD: An Implementable Decision-Support System for Prerelease Market Evaluation of Motion Pictures," *Marketing Science*, 19 (3), 226-43.

Eliashberg, Jehoshua and Steven M. Shugan (1997), "Film Critics: Influencers or Predictors?," *Journal of Marketing*, 61 (2), 68-78.

Epstein, Richard A. (2003), "The Regrettable Necessity of Contingent Valuation," *Journal of Cultural Economics*, 27 (3 - 4), 259-74.

Escalas, Jennifer E. and Barbara B. Stern (2003), "Sympathy and Empathy: Emotional Responses to Advertising Dramas," *Journal of Consumer Research*, 29 (March), 566-78.

Eurobarometer (2002), "Europeans' Participation in Cultural Activities," Brussels/Strasbourg: Eurostat.

Everitt, Brian S. (1993), *Cluster Analysis*. London [etc.]: Edward Arnold.

Everitt, Brian S. and S. Rabe-Hesketh (1997), *The Analysis of Proximity Data*. London [etc.]: Arnold.

Fernandez-Juricic, E., J. T. Erichsen, and A. Kacelnik (2004), "Visual Perception and Social Foraging in Birds," *Trends in Ecology & Evolution*, 19 (1), 25-31.

Finn, Adam, Stuart McFadyen, and Colin Hoskins (2003), "Valuing the Canadian Broadcasting Corporation," *Journal of Cultural Economics*, 27 (3 - 4), 177-92.

Florida, Richard (2002), *The Rise of the Creative Class : and How It's Transforming Work, Leisure, Community and Everyday Life*. New York, NY: Basic Books.

Forrest, D., K. Grime, and R. Woods (2000), "Is It Worth Subsidising Regional Repertory Theatre?," *Oxford Economic Papers*, 52 (2), 381-97.

Fort, Alexandra, Claude Delpuech, J. Pemier, and M. H. Giard (2002), "Early Auditory-Visual Interactions in Human Cortex During Nonredundant Target Identification," *Cognitive Brain Research*, 14 (1), 20-30.

Fraim, John (2000), "The Entertainment Economy," *Journal of Marketing*, 64 (1), 113-7.

Frey, Bruno S. (1998), "Superstar Museums: An Economic Analysis," *Journal of Cultural Economics*, 22 (2 - 3), 113-25.

Fuegi, D. and Jennings, M. (2003), International library statistics: Trends and commentary based on the LibEcon data, September 28, 2004

Gainer, Brenda (1993), "An Empirical Investigation of the Role of Involvement With a Gendered Product," *Psychology & Marketing*, 10 (4), 265-83.

Gainer, Brenda (1995), "Ritual and Relationships: Interpersonal Influences on Shared Consumption," *Journal of Business Research*, 32 (3), 253-60.

Garbarino, Ellen and Mark S. Johnson (2001), "Effects of Consumer Goals on Attribute Weighting, Overall Satisfaction, and Product Usage," *Psychology & Marketing*, 18 (9), 929-49.

Garbarino, Ellen and Mark S. Johnson (1999), "The Different Roles of Satisfaction, Trust, and Commitment in Customer Relationships," *Journal of Marketing*, 63 (Apr), 70-87.

Gardner, Howard (1983), *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.

Garlin, Francine V. and Robyn L. McGuiggan (2002), "Sex, Spies and Celluloid: Movie Content Preference, Choice, and Involvement," *Psychology & Marketing*, 19 (5), 427-45.

Ger, Güliz (1999), "Art and Consumption in Late Ming China, 1550-1644," in *Advances in Consumer Research*, Eric J. Arnould and Linda M. Scott, eds. Provo (UT): Association for Consumer Research, 640.

Gershoff, Andrew D., Susan M. Broniarczyk, and Patricia M. West (2001), "Recommendation or Evaluation? Task Sensitivity in Information Source Selection," *Journal of Consumer Research*, 28 (Dec), 418-38.

Giard, M. H. and F. Peronnet (1999), "Auditory-Visual Integration During Multimodal Object Recognition in Humans: A Behavioral and Electrophysiological Study," *Journal of Cognitive Neuroscience*, 11 (5), 473-90.

Goldberg, Marvin E., Amitava Chattopadhyay, Gerald J. Gorn, and Jerry Rosenblatt (1993), "Music, Music Videos, and Wear Out," *Psychology & Marketing*, 10 (1), 1-13.

Goulding, Christina (2001), "Romancing the Past: Heritage Visiting and the Nostalgic Consumer," *Psychology & Marketing*, 18 (6), 565-92.

Gramser, Heide (1997), *Werkboek Werken Met PMC's in Openbare Bibliotheken [Manual Working With PMC's in Public Libraries]*. The Hague: NBLC.

Green, Donald P., Daniel Kahneman, and Howard Kunreuther (1994), "How the Scope and Method of Public Funding Affect Willingness to Pay for Public Goods," *Public Opinion Quarterly*, 58 (1), 49-67.

Grewal, Dhruv, Julie Baker, Michael Levy, and Glenn B. Voss (2003), "The Effects of Wait Expectations and Store Atmosphere Evaluations on Patronage Intentions in Service-Intensive Retail Stores," *Journal of Retailing*, 79 (4), 259-68.

Groenland, Edward A. G. and Jan P. L. Schoormans (1994), "Comparing Mood-Induction and Affective Conditioning As Mechanisms Influencing Product Evaluation and Product Choice," *Psychology & Marketing*, 11 (2), 183-97.

Grover, Rajiv and V. Srinivasan (1987), "A Simultaneous Approach to Market Segmentation and Market Structuring," *Journal of Marketing Research*, 24 (2), 139-53.

Gumilar, Dudung and Ian M. Johnson (1995), "Management Information Systems in Some Academic Libraries in Britain," *The New Review of Academic Librarianship*, 1 57-84.

Hahn, Minhi and Insuk Hwang (1999), "Effects of Tempo and Familiarity of Background Music on Message Processing in TV Advertising: A Resource-Matching Perspective," *Psychology & Marketing*, 16 (8), 659-75.

Hannigan, John (1998), *Fantasy City: Pleasure and Profit in the Postmodern Metropolis*. New York: Routledge.

Hansen, Trine B. (1997), "The Willingness-to-Pay for the Royal Theatre in Copenhagen As a Public Good," *Journal of Cultural Economics*, 21 (1), 1-28.

Harrison, Paul J. and Robin N. Shaw (2004), "Intra-Organisational Marketing Culture and Market Orientation: a Case Study of the Implementation of the Marketing Concept in a Public Library," *Library Management*, 25 (8/9), 391-8.

Hayslett, Michele M. and Barbara M. Wildemuth (2004), "Pixels or Pencils? The Relative Effectiveness of Web-Based Versus Paper Surveys," *Library & Information Science Research*, 26 (1), 73-93.

Heckman, J. and B. Singer (1984), "A Method for Minimizing the Impact of Distributional Assumptions in Econometric Models for Duration Data," *Econometrica*, 52 (2), 271-320.

Hill, Ronald P. (1990), "Aids and the Arts," in *Advances in Consumer Research*, Marvin E. Goldberg, Gerald J. Gorn, and Richard W. Pollay, eds. Provo (UT): Association for Consumer Research, 294-7.

Hirschman, Elizabeth C. (1983), "Aesthetics, Ideologies and the Limits of the Marketing Concept," *Journal of Marketing*, 47 (Summer), 45-55.

Hirschman, Elizabeth C. (1988), "The Ideology Of Consumption: A Structural-Syntactical Analysis of "Dallas" and "Dynasty"," *Journal of Consumer Research*, 15 (3), 344-59.

Hirschman, Elizabeth C. and Morris B. Holbrook (1982), "Hedonic Consumption: Emerging Concepts, Methods and Propositions," *Journal of Marketing*, 46 (3), 92-101.

Hogg, Margaret K. and Emma N. Banister (2000), "The Structure and Transfer of Cultural Meaning: A Study of Young Consumers and Pop Music," in *Advances in Consumer Research*, Stephen J. Hoch and Robert J. Meyer, eds. Provo (UT): Association for Consumer Research, 19-23.

Holbrook, Morris B. (1980), "Some Preliminary Notes on Research in Consumer Esthetics," in *Advances in Consumer Research*, J. C. Olson, ed. Ann Arbor: Association for Consumer Research, 104-8.

Holbrook, Morris B. (1993), "Nostalgia and Consumption Preferences: Some Emerging Patterns of Consumer Tastes," *Journal of Consumer Research*, 20 (Sep.), 245-56.

Holbrook, Morris B. (1981), "Integrating Compositional and Decompositional Analyses to Represent the Intervening Role of Perceptions in Evaluative Judgments," *Journal of Marketing Research*, 18 (1), 13-28.

Holbrook, Morris B. (1999), "Popular Appeal Versus Expert Judgments of Motion Pictures," *Journal of Consumer Research*, 26 (September), 144-55.

Holbrook, Morris B. (2000), "The Millennial Consumer in the Texts of Our Times: Experience and Entertainment," *Journal of Macromarketing*, 20 (2), 178-92.

Holbrook, Morris B., Robert W. Chestnut, Terence A. Oliva, and Eric A. Greenleaf (1984), "Play As a Consumption Experience: The Roles of Emotions, Performance, and Personality in the Enjoyment of Games," *Journal of Consumer Research*, 11 (2), 728-39.

Holbrook, Morris B. and Mark W. Grayson (1986), "The Semiology of Cinematic Consumption: Symbolic Consumer Behavior in Out of Africa," *Journal of Consumer Research*, 13 (December), 374-81.

Holbrook, Morris B. and Elizabeth C. Hirschman (1982), "The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun," *Journal of Consumer Research*, 9 (2), 132-40.

Holbrook, Morris B. and Douglas V. Holloway (1984), "Marketing Strategy and the Structure of Aggregate, Segment-Specific, and Differential Preferences," *Journal of Marketing*, 48 (1), 62-7.

Holbrook, Morris B., William L. Moore, and Russell S. Winer (1982), "Constructing Joint Spaces From Pick-Any Data: A New Tool for Consumer Analysis," *Journal of Consumer Research*, 9 (1), 99-105.

Holbrook, Morris B. and Robert M. Schindler (1989), "Some Exploratory Findings On The Development Of Musical Taste," *Journal of Consumer Research*, 16 (June), 119-24.

Holbrook, Morris B. and Robert M. Schindler (1994), "Age, Sex, and Attitude Toward the Past As Predictors of Consumers' Aesthetic Tastes for Cultural Products," *Journal of Marketing Research*, 31 (3), 412-22.

Hood, David and Kay Henderson (2005), "Branding in the United Kingdom Public Library Service," *New Library World*, 106 (1/2), 16-28.

Huber, Joel and Morris B. Holbrook (1980), "The Determinants of Esthetic Value and Growth," in *Advances in Consumer Research*, J. C. Olson, ed. Ann Arbor: Association for Consumer Research, 121-6.

Huber, Joel and Morris B. Holbrook (1979), "Using Attribute Ratings for Product Positioning: Some Distinctions Among Compositional Approaches," *Journal of Marketing Research*, 16 (4), 507-16.

Hui, Michael K., Laurette Dubé, and Jean-Charles Chebat (1997), "The Impact of Music on Consumers' Reactions to Waiting for Services," *Journal of Retailing*, 73 (1), 87-104.

Hutter, Michael (1998), "Communication Productivity: A Major Cause for the Changing Output of Art Museums," *Journal of Cultural Economics*, 22 (2 - 3), 99-112.

Inman, J. J. (2001), "The Role of Sensory-Specific Satiety in Attribute-Level Variety Seeking," *Journal of Consumer Research*, 28 (1), 105-20.

Jack, C. E. and W. R. Thurlow (1973), "Effects of Degree of Visual Association and Angle of Displacement on Ventriloquism Effect," *Perceptual and Motor Skills*, 37 (3), 967-79.

Jedidi, Kamel, Robert E. Krider, and Charles B. Weinberg (1998), "Clustering at the Movies," *Marketing Letters*, 9 (4), 393-405.

Jones, J. M. and Christopher J. Ritz (1991), "Incorporating Distribution into New Product Diffusion Models," *International Journal of Research in Marketing*, 8 (2), 91-112.

Joy, Annamma and John F. Sherry Jr. (2003), "Speaking of Art As Embodied Imagination: A Multisensory Approach to Understanding Aesthetic Experience," *Journal of Consumer Research*, 30 (September), 259-82.

Kamakura, Wagner A., Sridhar N. Ramaswami, and Rajendra K. Srivastava (1991), "Applying Latent Trait Analysis in the Evaluation of Prospects for Cross-Selling of Financial Services," *International Journal of Research in Marketing*, 8 (4), 329-49.

Kassarjian, Harold H. (1980), "Consumer Esthetics: A Commentary," in *Advances in Consumer Research*, J. C. Olson, ed. Ann Arbor: Association for Consumer Research, 127-8.

Kearns, Gerry and Chris Philo (1993), *Selling Places : the City As Cultural Capital, Past and Present*. Oxford [etc.]: Pergamon Press.

Keenan, J. P., V. Thangaraj, A. R. Halpern, and G. Schlaug (2001), "Absolute Pitch and Planum Temporale," *Neuroimage*, 14 (6), 1402-8.

Kellaris, James J. (1992), "Consumer Aesthetics Outside the Lab - Preliminary-Report on A Musical Field-Study," in *Advances in Consumer Research*, John F. Sherry Jr. and Brian Sternthal, eds. Provo (UT): Association for Consumer Research, 730-4.

Kellaris, James J. and Anthony D. Cox (1989), "The Effects Of Background Music In Advertising: A Reassessment," *Journal of Consumer Research*, 16 (1), 113-8.

Kellaris, James J., Anthony D. Cox, and Dena S. Cox (1993), "The Effect of Background Music on Ad Processing: A Contingency Explanation," *Journal of Marketing*, 57 (October), 114-25.

Kellaris, James J. and Ronald C. Rice (1993), "The Influence of Tempo, Loudness, and Gender of Listener on Responses to Music," *Psychology & Marketing*, 10 (1), 15-29.

Keller, Kevin L. (1993), "Conceptualizing, Measuring, and Managing Customer-Based Brand Equity," *Journal of Marketing*, 57 (1), 1-22.

Kineta, Hung (2001), "Framing Meaning Perceptions With Music: The Case of Teaser Ads," *Journal of Advertising*, 30 (3), 39-49.

Kohl, R. L. (1987), "Mechanisms of Selective Attention and Space Motion Sickness," *Aviation Space and Environmental Medicine*, 58 (11), 1130-2.

Kotler, Philip J. (1975), *Marketing for Nonprofit Organizations*. Englewood Cliffs, N.J.: Prentice-Hall.

Kotler, Philip J. and Joanne Scheff (1997), *Standing Room Only: Strategies for Marketing the Performing Arts*. Boston: Harvard Business School Press.

Kozinets, Robert V. (2001), "Utopian Enterprise: Articulating the Meanings of Star Trek's Culture of Consumption," *Journal of Consumer Research*, 28 (June), 67-88.

Krider, Robert E. and Charles B. Weinberg (1998), "Competitive Dynamics and the Introduction of New Products: The Motion Picture Timing Game," *Journal of Marketing Research*, 35 (Feb), 1-15.

Lacher, Kathleen T. (1989), "Hedonic Consumption - Music As A Product," in *Advances in Consumer Research*, Thomas K. Srull, ed. Provo (UT): Association for Consumer Research, 367-73.

Lacher, Kathleen T. (1994), "An Investigation of the Influence of Gender on the Hedonic Responses Created by Listening to Music," in *Advances in Consumer Research*, Chris T. Allen and Debora Roedder John, eds. Provo (UT): Association for Consumer Research, 354-8.

Lacher, Kathleen T. and Richard W. Mizerski (1994), "An Exploratory Study of the Responses and Relationships Involved in the Evaluation of, and in the Intention to Purchase New Rock Music," *Journal of Consumer Research*, 21 (September), 366-80.

Landry, Charles (2000), *The Creative City : a Toolkit for Urban Innovators*. Near Stroud: Comedia.

Leeflang, Peter S. H. and Dick R. Wittink (2000), "Building Models for Marketing Decisions:: Past, Present and Future," *International Journal of Research in Marketing*, 17 (2-3), 105-26.

Lefkoff-Hagius, Roxanne and Charlotte H. Mason (1993), "Characteristic, Beneficial, and Image Attributes in Consumer Judgments of Similarity and Preference," *Journal of Consumer Research*, 20 (1), 100-10.

Legum, Lynn T. and William R. George (1981), "Analysis of Marketing Management Practices of Dance Companies," *Journal of the Academy of Marketing Science*, 9 (1), 15-27.

Lehmann, Donald R. and Charles B. Weinberg (2000), "Sale Through Sequential Distribution Channels: An Application to Movies and Videos," *Journal of Marketing*, 64 (July), 18-33.

Lewkowicz, D. J. (1988b), "Sensory Dominance in Infants: 2. Ten-Month-Old Infants' Response to Auditory-Visual Compounds," *Developmental Psychology*, 24 (2), 172-82.

Lewkowicz, D. J. (1994), "Development of Intersensory Perception in Human Infants," in *The Development of Intersensory Perception; Comparative Perspectives*, D. J. Lewkowicz and Robert Lickliter, eds. Hillsdale (NJ): Erlbaum.

Lewkowicz, D. J. (1988a), "Sensory Dominance in Infants .1. 6-Month-Old Infants Response to Auditory-Visual Compounds," *Developmental Psychology*, 24 (2), 155-71.

Macklin, M. C. (1994), "The Impact of Audiovisual Information on Children's Product-Related Recall," *Journal of Consumer Research*, 21 (1), 154-64.

Marquis, Marie and Pierre Filiatrault (2002), "Understanding Complaining Responses Through Consumer's Self-Consciousness Disposition," *Psychology & Marketing*, 19 (3), 267-92.

Martin, Fernand (1994), "Determining the Size of Museum Subsidies," *Journal of Cultural Economics*, 18 255-70.

Mathwick, Charla and Edward Rigdon (2004), "Play, Flow, and the Online Search Experience," *Journal of Consumer Research*, 31 (2), 324-32.

Mattila, Anna S. and Jochen Wirtz (2001), "Congruency of Scent and Music As a Driver of In-Store Evaluations and Behavior," *Journal of Retailing*, 77 (2), 273-89.

McAnally, K. I., Anne Castles, and G. W. Stuart (2000), "Visual and Auditory Processing Impairments in Subtypes of Developmental Dyslexia: A Discussion," *Journal of Developmental and Physical Disabilities*, 12 (2), 145-56.

McCart, Mike (1992), "Research at the South Bank Center," *Journal of the Market Research Society*, 34 (4), 361-74.

McCracken, Grant (1989), "Who Is The Celebrity Endorser? Cultural Foundations Of The," *Journal of Consumer Research*, 16 (3), 310-21.

McCracken, Grant (1986), "Culture and Consumption: A Theoretical Account of the Structure and Movement of the Cultural Meaning of Consumer Goods," *Journal of Consumer Research*, 13 (1), 71-84.

McFadden, D. (1981), "Econometric Models of Probabilistic Choice," in *Structural Analysis of Discrete Data With Econometric Applications*, C. Manski and D. McFadden, eds. Cambridge (MA): MIT Press.

McFadden, D. (1974), "Conditional Logit Analysis of Qualitative Choice Behavior," in *Frontiers in Econometrics*, P. Zarembka, ed. New York: Academic Press.

McGurk, H. and J. MacDonald (1976), "Hearing Lips and Seeing Voices," *Nature*, 264 (5588), 746-8.

Meamber, Laurie A. and Alladi Venkatesh (1999), "The Flesh Is Made Symbol: An Interpretive Account of Contemporary Bodily Performance Art," in *Advances in Consumer Research*, Eric J. Arnould and Linda M. Scott, eds. Provo (UT): Association for Consumer Research, 190-4.

Moe, Wendy W. and Peter S. Fader (2001), "Modeling Hedonic Portfolio Products: A Joint Segmentation Analysis of Music Compact Disc Sales," *Journal of Marketing Research*, 38 (August), 376-85.

Moe, Wendy W. and Peter S. Fader (2002), "Using Advance Purchase Orders to Forecast New Product Sales," *Marketing Science*, 21 (3), 347-64.

Montgomery, Kathryn and Shelley Pasnik (1996), "Web of Deception, Threats to Children From Online Marketing," Washington: Center for Media Education.

Morey, Edward and Kathleen Greer Rossmann (2003), "Using Stated-Preference Questions to Investigate Variations in Willingness to Pay for Preserving Marble Monuments: Classic Heterogeneity, Random Parameters, and Mixture Models," *Journal of Cultural Economics*, 27 (3 - 4), 215-29.

Moss, C. F. and S. R. Sinha (2003), "Neurobiology of Echolocation in Bats," *Current Opinion in Neurobiology*, 13 (6), 751-8.

Mouly, A. M., Alexandra Fort, N. Ben-Boutayab, and R. Gervais (2001), "Olfactory Learning Induces Differential Long-Lasting Changes in Rat Central Olfactory Pathways," *Neuroscience*, 102 (1), 11-21.

Nagard-Assayag, Emmanuelle L. and Delphine Manceau (2001), "Modeling the Impact of Product Preannouncements in the Context of Indirect Network Externalities," *International Journal of Research in Marketing*, 18 (3), 203-19.

National Center for Education Statistics (2003), "Public Libraries in the United States: Fiscal Year 2001," Washington: National Center for Education Statistics.

National Endowment for the Arts (1981), *Economic Impact of Arts and Cultural Institutions : Case Studies in Columbus, Minneapolis/St. Paul, St. Louis, Salt Lake City, San Antonio, Springfield*. Washington, D.C: National Endowment for the Arts.

National Endowment for the Arts (1998), "1997 Survey of Public Participation in the Arts," Washington: National Endowment for the Arts.

Navrud, Ståle and Richard C. Ready (2002), *Valuing Cultural Heritage; Applying Environmental Techniques to Historic Buildings, Monuments and Artifacts*. Cheltenham: Edward Elgar.

Neelamegham, Ramya and Pradeep Chintagunta (1999), "A Bayesian Model to Forecast New Product Performance in Domestic and International Markets," *Marketing Science*, 18 (2), 115-36.

Ngobo, Paul V. (2005), "Drivers of Upward and Downward Migration: An Empirical Investigation Among Theatregoers," *International Journal of Research in Marketing*, 22 (2), 183-201.

Noonan, Douglas S. (2003), "Contingent Valuation and Cultural Resources: A Meta-Analytic Review of the Literature," *Journal of Cultural Economics*, 27 (3 - 4), 159-76.

Oakes, Steve (2003), "Musical Tempo and Waiting Perceptions," *Psychology & Marketing*, 20 (8), 685-705.

Olsen, Barbara and Stephen J. Gould (1999), "Jamaican DJ Music Lyrics, and Postmodern Consumption: Liberatory for Whom?," in *Advances in Consumer Research*, Eric J. Arnould and Linda M. Scott, eds. Provo (UT): Association for Consumer Research, 44.

Ottensman, John R. (1997), "Using Geographic Information Systems to Analyze Library Utilization," *Library Quarterly*, 67 (1), 24-49.

Pantev, C. and B. Lutkenhoner (2000), "Magnetoencephalographic Studies of Functional Organization and Plasticity of the Human Auditory Cortex," *Journal of Clinical Neurophysiology*, 17 (2), 130-42.

Papandrea, Franco (1999), "Willingness to Pay for Domestic Television Programming," *Journal of Cultural Economics*, 23 (3), 147-64.

Peterson, Richard A. (1992), "Understanding Audience Segmentation: From Elite and Mass to Omnivore and Univore," *Poetics*, 21 (4), 243-58.

Pollicino, Marilena and David Maddison (2001), "Valuing the Benefits of Cleaning Lincoln Cathedral," *Journal of Cultural Economics*, 25 (2), 131-48.

Poor, P. J. and Jamie M. Smith (2004), "Travel Cost Analysis of a Cultural Heritage Site: The Case of Historic St. Mary's City of Maryland," *Journal of Cultural Economics*, 28 (3), 217-29.

Poulsen, Carsten S. (1990), "Mixed Markov and Latent Markov Modelling Applied to Brand Choice Behaviour," *International Journal of Research in Marketing*, 7 (1), 5-19.

Prieto-Rodríguez, Juan and Víctor Fernández-Blanco (2000), "Are Popular and Classical Music Listeners the Same People?," *Journal of Cultural Economics*, 24 (2), 147-64.

Prochak, Michael (1996), *Computers for the Arts: Marketing and Management*. London: Arts Council.

Putler, Daniel S. and Shilpa Lele (2003), "An Easily Implemented Framework for Forecasting Ticket Sales to Performing Arts Events," *Marketing Letters*, 14 (4), 307-20.

Rao, Vithala R. and Darius J. Sabavala (1981), "Inference of Hierarchical Choice Processes From Panel Data," *Journal of Consumer Research*, 8 (1), 85-96.

Ratner, Rebecca K., Barbara E. Kahn, and Daniel Kahneman (1999), "Choosing Less-Preferred Experiences for the Sake of Variety," *Journal of Consumer Research*, 26 (1), 1-15.

Rawlings-Jackson, Vanessa (1995), *Where Now? Theater Subscription Selling in the 90s*. London: Arts Council.

Reddy, Srinivas K., Vanitha Swaminathan, and Carol M. Motley (1998), "Exploring the Determinants of Broadway Show Success," *Journal of Marketing Research*, 35 (August), 370-83.

Robbins, John E. and Stephanie S. Robbins (1981), "Museum Marketing: Identification of High, Moderate, and Low Attendee Segments," *Journal of the Academy of Marketing Science*, 9 (1), 66-76.

Robinson, C. W. and V. M. Sloutsky (2004), "Auditory Dominance and Its Change in the Course of Development," *Child Development*, 75 (5), 1387-401.

Roehm, Michelle L. (2001), "Instrumental Vs. Vocal Versions of Popular Music in Advertising," *Journal of Advertising Research*, 41 (3), 49-58.

Russell, Cristel A., Andrew T. Norman, and Susan E. Heckler (2004), "The Consumption of Television Programming: Development and Validation of the Connectedness Scale," *Journal of Consumer Research*, 31 (1), 150-61.

Russell, Gary J. and Wagner A. Kamakura (1994), "Understanding Brand Competition Using Micro and Macro Scanner Data," *Journal of Marketing Research*, 31 (May), 289-303.

Ryans, Adrian B. and Charles B. Weinberg (1978), "Consumer Dynamics in Nonprofit Organizations," *Journal of Consumer Research*, 5 (Sep.), 89-95.

Saarti, Jarmo (2002), "Consistency of Subject Indexing of Novels by Public Library Professionals and Patrons," *Journal of Documentation*, 58 (1), 49-65.

Santagata, Walter and Giovanni Signorello (2000), "Contingent Valuation of a Cultural Public Good and Policy Design: The Case of ``Napoli Musei Aperti"," *Journal of Cultural Economics*, 24 (3), 181-204.

Sass, Rivkah K. (2002), "Marketing the Worth of Your Library," *Library Journal*, 127 (11), 37.

Sawhney, Mohanbir S. and Jehoshua Eliashberg (1996), "A Parsimonious Model for Forecasting Gross Box-Office Revenues of Motion Pictures," *Marketing Science*, 15 (2), 113-31.

Schau, Hope J. and Mary C. Gilly (2003), "We Are What We Post? Self-Presentation in Personal Web Space," *Journal of Consumer Research*, 30 (December), 385-404.

Schroeder, Jonathan E. and Janet L. Borgerson (1999), "Packaging Paradise: Consuming Hawaiian Music," in *Advances in Consumer Research*, Eric J. Arnould and Linda M. Scott, eds. Provo (UT): Association for Consumer Research, 46-50.

Schulz, M., B. Ross, and C. Pantev (2003), "Evidence for Training-Induced Crossmodal Reorganization of Cortical Functions in Trumpet Players," *Neuroreport*, 14 (1), 157-61.

Schwartz, S (1978), "Estimating the Dimensions of a Model," *Annals of Statistics*, 6 461-4.

Scott, Linda M. (1990), "Understanding Jingles and Needledrop: A Rhetorical Approach," *Journal of Consumer Research*, 17 (2), 223.

Scott, Linda M. (1994), "The Bridge From Text to Mind: Adapting Reader-Response Theory to Consumer Research," *Journal of Consumer Research*, 21 (3), 461-80.

Semenik, Richard J. and Clifford Young (1980), "Correlates of Ticket Subscription Behavior," in *Advances in Consumer Research*, J. C. Olson, ed. Ann Arbor: Association for Consumer Research, 114-8.

Sexton, Donald E. and Kathryn Britney (1980), "Behavioural Segmentation of the Arts Market," in *Advances in Consumer Research*, J. C. Olson, ed. Ann Arbor: Association for Consumer Research, 119-20.

Shapiro, Stewart and Mark T. Spence (2002), "Factors Affecting Encoding, Retrieval, and Alignment of Sensory Attributes in a Memory-Based Brand Choice Task," *Journal of Consumer Research*, 28 (March), 603-17.

Shaw, Christopher A. and Jill C. McEachern (2001), *Toward a Theory of Neuroplasticity*. Philadelphia (PA): Psychology Press.

Singer, Jerome L. (1966), *Daydreaming : an Introduction to the Experimental Study of Inner Experience*. New York: Random House.

Sloutsky, V. M. and A. C. Napolitano (2003), "Is a Picture Worth a Thousand Words? Preference for Auditory Modality in Young Children," *Child Development*, 74 (3), 822-33.

Smith, Wendell R. (1956), "Product Differentiation and Market Segmentation As Alternative Marketing Strategies," *Journal of Marketing*, 21 3.

Soman, Dilip and Amar Cheema (2001), "The Effect of Windfall Gains on the Sunk-Cost Effect," *Marketing Letters*, 12 (1), 51-62.

Soman, Dilip and Amar Cheema (2004), "When Goals Are Counterproductive: The Effects of Violation of a Behavioral Goal on Subsequent Performance," *Journal of Consumer Research*, 31 (June), 52-62.

Soman, Dilip and John T. Gourville (2001), "Transaction Decoupling: How Price Bundling Affects the Decision to Consume," *Journal of Marketing Research*, 38 (February), 30-44.

Spiggle, Susan (1986), "Measuring Social Values: A Content Analysis of Sunday Comics and Underground Comix," *Journal of Consumer Research*, 13 (1), 100-13.

Stern, Barbara B. (1989), "Literary Critism And Consumer Research: Overview And Illustrative Analysis," *Journal of Consumer Research*, 16 (3), 322-34.

Stern, Barbara B. (1993), "Feminist Literary Criticism and the Deconstruction of Ads: A Postmodern View of Advertising and Consumer Responses," *Journal of Consumer Research*, 19 (4), 556.

Stern, Barbara B. (1995), "Consumer Myths: Frye's Taxonomy and the Structural Analysis of a Consumption Text," *Journal of Consumer Research*, 22 (Sep.), 165-85.

Stern, Barbara B. (1994), "Classical and Vignette Television Advertising Dramas: Structural Models, Formal Analysis, and Consumer Effects," *Journal of Consumer Research*, 20 (March), 601-15.

Stewart, David W. and Girish N. Punj (1998), "Effects of Using a Nonverbal (Musical) Cue on Recall and Playback of Television Advertising: Implications for Advertising Tracking," *Journal of Business Research*, 42 (1), 39.

Stibal, Mary E. (1977), "Disco - Birth of a New Marketing System," *Journal of Marketing*, 41 (October), 82-8.

Sullivan, Gary L. (1990), "Music Format Effects in Radio Advertising," *Psychology & Marketing*, 7 (2), 97.

Swait, J. and R. L. Andrews (2003), "Enriching Scanner Panel Models With Choice Experiments," *Marketing Science*, 22 (4), 442-60.

Swami, Sanjeev, Jehoshua Eliashberg, and Charles B. Weinberg (1999), "SilverScreener: A Modeling Approach to Movie Screen Management," *Marketing Science*, 18 (3), 352-72.

Talcott, J. B., C. Witton, M. F. Mclean, P. C. Hansen, A. Rees, G. G. R. Green, and J. F. Stein (2000), "Dynamic Sensory Sensitivity and Children's Word Decoding Skills," *Proceedings of the National Academy of Sciences of the United States of America*, 97 (6), 2952-7.

Tavassoli, Nader T. and Hwai L. Yih (2003), "The Differential Interaction of Auditory and Visual Advertising Elements With Chinese and English," *Journal of Marketing Research*, 40 (4), 468-80.

Thompson, Eric, Mark Berger, Glenn Blomquist, and Steven Allen (2002), "Valuing the Arts: A Contingent Valuation Approach," *Journal of Cultural Economics*, 26 (2), 87-113.

Throsby, David (2003), "Determining the Value of Cultural Goods: How Much (or How Little) Does Contingent Valuation Tell Us?," *Journal of Cultural Economics*, 27 (3 - 4), 275-85.

Thurlow, W. R. and C. E. Jack (1973), "Certain Determinants of Ventriloquism Effect," *Perceptual and Motor Skills*, 36 (3), 1171-84.

Tomlinson, R. (1992), "Finding Out More From Box Office Data," *Journal of the Market Research Society*, 34 (4), 389-404.

Tomlinson, R. (1993), *Boxing Clever: Getting the Most Out of the Box Office*. London: Arts Council.

Tomlinson, R. (1994), *Computerised Box Office System Usage*. London: Arts Council.

Tversky, A. (1972), "Elimination by Aspects - Theory of Choice," *Psychological Review*, 79 (4), 281-99.

Tversky, A. and S. Sattath (1979), "Preference Trees," *Psychological Review*, 86 (6), 542-73.

Umiker-Sebeok, Jean (1992), "Meaning Construction in A Cultural Gallery - A Sociosemiotic Study of Consumption Experiences in A Museum," in *Advances in Consumer Research*, John F. Sherry Jr. and Brian Sternthal, eds. Provo (UT): Association for Consumer Research, 46-55.

Urban, Glen L., Philip L. Johnson, and John R. Hauser (1984), "Testing Competitive Market Structures," *Marketing Science*, 3 (2), 83.

Van der Pol, F., Rolf Langeheine, and W. De Jong (1991), "PANMARK User Manual: Panel Analysis Using Markov Chains Version 2.2," s.l..

Van Puffelen, Frank (1987), *The Economic Impact of the Arts in Amsterdam*. Amsterdam: SEO.

Van Schuur, Wijbrandt H. (1997), "Intrinsic and Extrinsic Work Values As a Single Unfolding Scale," in *Applications of Latent Trait and Latent Class Models in the Social Sciences*, Jürgen Rost and Rolf Langeheine, eds. New York: Waxmann.

Van Schuur, Wijbrandt H. and Henk A. L. Kiers (1994), "Why Factor Analysis Is Often the Wrong Model for Analyzing Bipolar Concepts, and What Model to Use Instead," *Applied Psychological Measurement*, 18 (2), 97-110.

Van Trijp, Hans C. M., Wayne D. Hoyer, and J. J. Inman (1996), "Why Switch? Product Category-Level Explanations for True Variety-Seeking Behavior," *Journal of Marketing Research*, 33 (3), 281-92.

Venkatesh, R. and Vijay Mahajan (1993), "A Probabilistic Approach to Pricing a Bundle of Products or Services," *Journal of Marketing Research*, 30 (November), 494-508.

Vereniging Openbare Bibliotheken (2005), Voortgangsrapportage en overzicht brancheformules [Progress Report and Overview Branche Formulas], accessed at: http://www.debibliotheken.nl/content.jsp?objectid=2557 on October 20, 2005

Verhoef, Peter C., Penny N. Spring, Janny C. Hoekstra, and Peter S. H. Leeflang (2003), "The Commercial Use of Segmentation and Predictive Modeling Techniques for Database Marketing in the Netherlands," *Decision Support Systems*, 34 (4), 471-81.

Verwey, Peter (1992), "What the Arts Council Wants From Research and How It Can Help," *Journal of the Market Research Society*, 34 (4), 313-21.

Veryzer Jr., Robert W. and J. W. Hutchinson (1998), "The Influence of Unity and Prototypicality on Aesthetic Responses to New Product Designs," *Journal of Consumer Research*, 24 (Mar.), 374-94.

Wakefield, Kirk L. and Jeffrey G. Blodgett (1999), "Customer Response to Intangible and Tangible Service Factors," *Psychology & Marketing*, 16 (1), 51-68.

Walshe, P. (1992), "Probing the Potential Or Seriously Taking the Arts Less Seriously," *Journal of the Market Research Society*, 34 (4), 437-52.

Wansink, Brian (1992), "Listen to the Music - Its Impact on Affect, Perceived Time Passage, and Applause," in *Advances in Consumer Research*, John F. Sherry Jr. and Brian Sternthal, eds. Provo (UT): Association for Consumer Research, 715-8.

Ward, Stephen V. (1998), *Selling Places : the Marketing and Promotion of Towns and Cities, 1850-2000*. New York: Routledge.

Wedel, Michel and Wayne S. DeSarbo (1995), "A Mixture Likelihood Approach for Generalised Linear Models," *Journal of Classification*, 12 (1), 21-56.

Wedel, Michel and Wayne S. DeSarbo (1998), "Mixtures of (Constrained) Ultrametric Trees," *Psychometrika*, 63 (4), 419-43.

Wedel, Michel, Wayne S. DeSarbo, J. R. Bult, and V. Ramaswany (1993), "A Latent Class Poisson Regression Model for Heterogeneous Count Data With an Application to Direct Mail," *Journal of Applied Econometrics*, 8 397-411.

Wedel, Michel, Wagner Kamakura, and Ulf Bockenholt (2000), "Marketing Data, Models and Decisions," *International Journal of Research in Marketing*, 17 (2-3), 203-8.

Wedel, Michel and Wagner A. Kamakura (2000), *Market Segmentation : Conceptual and Methodological Foundations*. Boston; Dordrecht [etc.]: Kluwer Academic Publishers.

Weinberg, Charles B. (1986), "Arts Plan: Implementation, Evolution, and Usage," *Marketing Science*, 5 (2), 143-58.

Weinberg, Charles B. and Kenneth M. Shachmut (1978), "ARTS Plan: A Model Based System for Use in Planning a Performing Arts Series," *Management Science*, 24 (6), 654-64.

Welch, R. B. (1999), "Meaning, Attention and the 'Unity Assumption' in the Intersensory Bias of Spatial and Temporal Perceptions," in *Cognitive Contributions to the Perception of Spatial and Temporal Events*, Gisa Achschersleben, Talis Bachmann, and Jochen Müsseler, eds. Amsterdam, The Netherlands: Elsevier.

Welch, R. B. and D. H. Warren (1980), "Immediate Perceptual Response to Intersensory Discrepancy," *Psychological Bulletin*, 88 (3), 638-67.

Whitehead, John C. and Suzanne S. Finney (2003), "Willingness to Pay for Submerged Maritime Cultural Resources," *Journal of Cultural Economics*, 27 (3 - 4), 231-40.

Willis, K. G. (2002), "Research Note: Iterative Bid Design in Contingent Valuation and the Estimation of the Revenue Maximising Price for a Cultural Good," *Journal of Cultural Economics*, 26 (4), 307-24.

Witkin, H. A., S. Wapner, and T. Leventhal (1952), "Sound Localization With Conflicting Visual and Auditory Cues," *Journal of Experimental Psychology*, 43 (1), 58-67.

Witkowski, Terrence H. (1999), "Painting the Domestication of Consumption in 19th-Century America," in *Advances in Consumer Research*, Eric J. Arnould and Linda M. Scott, eds. Provo (UT): Association for Consumer Research, 644-51.

Wolf, Michael (1999), *The Entertainment Economy: How Mega-Media Forces Are Transforming Our Lives*. New York: Times Books.

Woodside, Arch G. and Alan E. Singer (1994), "Social Interaction Effects in the Framing of Buying Decisions," *Psychology & Marketing*, 11 (1), 27-34.

Yu, Liangzhi and Ann Apps (2000), "Studying E-Journal User Behavior Using Log Files: The Experience of SuperJournal," *Library & Information Science Research*, 22 (3), 311-38.

Zajonc, Robert B. and Hazel Markus (1982), "Affective and Cognitive Factors in Preferences," *Journal of Consumer Research*, 9 (2), 123-31.

Zauberman, Gal (2003), "The Intertemporal Dynamics of Consumer Lock-In," *Journal of Consumer Research*, 30 (December), 405-19.

Zuckerman, Marvin (1979), *Sensation Seeking: Beyond the Optimal Level of Arousal*. Hillsdale, NJ: Erlbaum.

Marketing arts and entertainment is a challenge. Consumers may buy the same groceries every week, but when it comes to arts and entertainment, people usually want something different from last time. The result: a vast, constantly changing choice of books, cd's, movies, performances and shows to meet this need for variety and novelty. But how do you help consumers find their way in this plethora of options? Who do you approach when you have a new performance to sell every night, but don't want to inundate your customers with direct mail? How do you compose attractive subscription packages that help you get a head start in filling the house?

Since recently, many cultural organizations have new, advanced transaction data systems that record individual buying histories. Modern theater box office systems link a customer id and address with each transaction; library loan systems track the borrowing behavior of patrons to ensure the timely return of books; and in The Netherlands, the visiting behavior of National Museum Card holders is logged electronically on central servers to aid reimbursement to participating museums. We show how these transaction data may help in understanding who likes what: what types of arts and entertainment consumers are there and what types of products do they like? Armed with such insights, marketers may be more effective in composing the right subscription packages, in selecting the right direct mail prospects or in designing the right presentation for the abundance and variety of choice.

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